RAILROAD GAZETTE

FRIDAY, AUGUST 17, 1900.

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Contributions

The Level of Salt Lake and the Location of the U. P.

Newark, Del., Aug. 6, 1900.

TO THE EDITOR OF THE RAILROAD GAZETTE.

Early in 1868 the Union Pacific railroad made surveys around the northern end of Great Salt Lake. One line was run from the mouth of the Weber Valley, leaving the canyon as soon as practicable without putting in opposing grades, and going as direct as possible to the southwestern point of Mud Island, and thence across the mouth of Bear River Bay, passing south of the Promontory Range. This would have made a low grade, and much shorter line than the one that was built. But it was found that the water, for several miles, was 22 ft. in depth. According to Stansbury's survey, made in 1848, there should have been only 10 ft. The Lake has an annual rise and fall, but for several years preceding the last survey the rise had been greater than the fall. No suitable material for piling was available, and so the road was built over the Promontory. Now the conditions are reversed, and the Lake has fallen several feet. It will probably continue to fall so long as the area of evaporation is increasing, which will be until all the water available for irrigation is utilized.

JAS. R. MAXWELL.

Collis P. Huntington.

One of the most powerful influences in American railroad affairs passes away in the death of Mr. C. P. Huntington; indeed, we may say in American business affairs in general. Mr. Huntington's intellectual ability, his courage, energy, patience and gift of creative imagination combined to make a colossal figure in our social and industrial history. And his physical gifts had made great achievements easy. These are faintly suggested by the portrait which shows his massive and well-shaped head and his great shoulders, but necessarily the picture fails to give a notion of his stature. He stood 6 ft. 1 in. high, and weighed over 200 lbs., and carried no fat.

Huntington was born in Harwinton, Litchfield County, Conn., Oct. 22, 1821. When he was 14 years old his father gave him his freedom, and from that day until his death he earned his own living. In the first year of self-support he earned $84 and his board and clothes, and this was the solid foundation of his fortune, the significance of it being that he earned that year, as ever after, more than he spent. His minority was spent as a traveling salesman, particularly in the Southern states. At 21 he went into partnership with a brother in a store at Oneonta. N. Y., dealing in general merchandise.

In 1848 he decided to go to California, and was detained on the Isthmus three months waiting for a northbound ship. Here he spent his time to good advantage, walking 24 times across the Isthmus, trading in such commodities as he could get, and having started from home with $1,200 he landed in California with $5,000, and at once established a store and speedily became known to the community as "Old Huntington," although he was only 27, the adjective doubtless suggesting something of the solidity of his character. In course of time he formed a partnership with Mark Hopkins and the partners became rich in trade and Mr. Huntington's busy imagination opened up broader and broader projects, until he, finally, with Mark Hopkins, Leland Stanford and Charles Crocker evolved the scheme of the Central Pacific Railroad. Mr. Huntington came east to work this up, and, in 1862, the enabling act was passed. Huntington telegraphed to his associates: "We have drawn the elephant. Now let us see if we can harness him." How completely the elephant was harnessed is a matter of worldwide knowledge.

The Southern Pacific, through Los Angeles, New Mexico and Texas, was his next great enterprise and the lines of the company were also pushed northward, invading Oregon. Then also the Mexican International was built, being completed in 1888; the Morgan line of steamships was acquired, as was the Pacific Mail Steamship Co., and as were large and small railroad properties, until, at the time of Mr. Huntington's death the roads controlled by him and his associates aggregated 10,431 miles. But Mr. Huntington had conceived of a railroad from the Atlantic to the Pacific, and to this end, bought, in 1869, the control of the Chesapeake & Ohio, and in 1884 created the Newport News & Mississippi Valley.

Of course, he must have an Atlantic terminus and the outcome of that necessity is the town of Newport News. Early in the eighties he and a few associates bought a large tract of land and established the coal and freight piers, elevators and other buildings of a great railroad terminus. Here also were built the Newport News shipyard and dry dock and within recent months Mr. Huntington has declared his purpose of erecting at Newport News an important steel works.

Mr. Huntington was a constructive force as distinguished from a speculator. His work in life was to create values and it was always his aim to put his railroad properties into a condition of the highest efficiency and to keep them so. He was deeply versed in the art of actual railroad building and operation, and was always watching for ways in which to improve his properties. But here his gift of reasonable sense and judgment came in to keep him from unprofitable experiments.

It would be hard to sum up satisfactorily, in a few words, a character like that of Mr. Huntington, and indeed men's estimates of him differ widely in some particulars. But we must all agree that he was in many ways a great man; his intelligence was great as was his judgment, and his patience amounted almost to genius. He himself said that nothing could beat him waiting "except the Catholic church." He was a man of broad sympathies and his sympathies extended beyond his own country and helped men of various lands and races by money and by counsel. He was a man of taste, fond of good books and particularly of poetry, which probably is part of that quality which we have mentioned as his creative imagination; and behind his gifts of mind and character lay the equally valuable gift of great physical power which enabled him to do, without hardship, the work which would have killed two or three ordinary men.

C. P. Huntington

Concerning the Panama Railroad.

BY GEORGE HEBARD PAINE.

Upon landing from one of the Panama Railroad Company's steamships at Colon the first thing which strikes one is that it is hot; afterward, when it is learned that the temperature is, let us say, 135 deg. in the sun, some surprise is felt that it doesn't seem hotter. The succeeding novel impressions come fast.

Here is a railroad 48 miles long which runs southeastwardly in order to go west; in other words, Panama, its western terminus, is actually eastward of Colon, its eastern terminus. Although it is in a Spanish country, its stock is held by a French company, its charter was granted by the state of New York, and it is dominated entirely by Americans, while as ordinary laborers it employs British negros almost exclusively. Although it runs through a fertile country and everything tropical is of rampant growth, bananas form the only freight of importance originating on the line. Although its European settlements date from about the year 1515 and it lies quite near the original line of travel which the Spanish explorers laid out, yet the surrounding country is little better known than the Congo basin.

The gage of the road is 5 ft., and except in some very unimportant matters this is the only variation from ordinary American practice. The locomotives are of the American type and the cars, with their familiar P. R. R., make the newcomer pause for an instant and wonder how the Pennsylvania Railroad manages to interchange at that distance.

The track is good—astonishingly so in view of the fact that most of the rail is 52 and 56 lbs. per yard. There is a small amount of Belgian rail of 70 lbs., which, however, is so wonderfully made that it has not much advantage over the light American pattern, and it gives an observer the idea that when its designer conceived it, he must have been standing on his head. Very briefly it may be described as a bull-head rail with part of the lower head converted into a flange. Where the Panama canal crosses the great divide at Culebra it was forced to occupy the railroad line and the canal company consequently built a diversion; in this case there is another exception to the light rail, since it is laid with the 70 lb. section of the A. S. C. E.

The cross ties are nominally 6 in. x 8 in. x 8 ft.; but actually they fall considerably short of that section, although most of them are of full length. The cross tie question is aggravated on the Isthmus, where there are eight months of wet weather, during which time nothing ever gets thoroughly dry. Everything decays but *lignum vitae*, whose virtues even are largely negative. It is harder than many metals, and so is not cut appreciably by the rails; but this also means that it resists nearly all tools, except when it is green. It does not check or warp in seasoning, but it does not grow large, and it is almost always bent and twisted naturally. But although a first-class *lignum vitae* cross tie costs $1.20, it never decays, and is expected to remain in the track for from twelve to fifteen years. The writer has seen some which are believed to have been in the track for more than twenty-five years. Curiously enough, it is the hardness of the tie which works its destruction. In order to get a spike in, a hole must be bored first, and once in, the spike is there to stay; but when the rail works up and down something must give way, and it is the head of the spike in this case, which, if it is not broken off, is cut off. Since the old spike cannot be pulled out, a new one is put in beside it, and this continues until the tie is actually cut off.

In the dry season the bed of the Chagres River offers an almost unlimited supply of splendid gravel, and it is largely used for ballasting the track between Colon and Matachin, more than half the length of the line. But at Pedro Miguel, about half way between Matachin and Panama, there is a crushing plant and quarry which serves the line from Panama northward, and has also supplied the ballast for the diversion at Culebra. The quarrying is done by hand drilling, and the rock is hauled to the crusher, about a quarter of a mile, by native ponies; the cost of the ballast on cars is less than 75 cents per cubic yard.

The only stone used for bridge masonry is really not a stone at all; it is a volcanic ash consolidated by pressure and without any binding material. Owing to its porous character, it would not stand a Northern winter, but it serves its purpose on the Isthmus in an admirable manner; in fact, it is the same material which has been used there for all of the most important structures during the last four centuries. The soil of the country is almost wholly argillaceous, and in the construction of piers and abutments, this demands a special treatment because of the terrific rainfall and the torrential character of the streams during the rainy season. At bridges and culverts, therefore, the whole bed of the stream is paved and surfaced with concrete, connecting both abutments and extending up and down stream for a considerable distance. By this means undermining is effectually prevented and wash-outs are nearly unknown.

There are no right-of-way fences; not because it would be difficult or expensive to build them, for it would not, but because they would do more harm than good. The

native ponies which now use the company's land for feeding ground are able to work their way through any fence, and so would still be trespassers, fence or no fence. But whereas they now make their escape from the trains with few casualties, experience has shown that this would not be so if they were restrained. Although the railroad is not fenced, many of the private yards along the line are, and it is a common thing to see a row of hibiscus or other flowering trees, 15 or 20 ft. high, and covered with blossoms. For in this generous soil and climate, a stake planted soon takes root and sends out branches.

In all probability the greatest single maintenance-of-way expense is the cutting of weeds. It costs, when done by hand with a shovel and hoe, between $40 and $50 a mile for each operation, and must be repeated several times in a year over a space about ten feet wide. But recently a plan devised by a Mr. Lampert has been tried with much promise of success. It consists in spraying the roadbed with a combined solution of arsenic and saltpeter, which kills everything organic that it touches, seed, root and branch, and at a cost for each spraying of not more than from one-third to one-half that of the manual method. There is an additional advantage in the spraying, because under the old plan the scratching and digging actually answered as a sort of cultivation; the poison, however, not only destroys all life, but nothing will grow while it remains, or until the ground has been re-seeded by the winds and birds. Neither would it be surprising if the mortality of ponies were to be increased enough by the poison to make their owners keep them off the right-of-way.

On the west side of the line the canal company has a telegraph line which was originally built on wooden poles; but these soon rotted and are now largely supplanted by worn-out rails, which are finished at the top with a piece of creosoted wood; this is fastened through the bolt holes, and serves to support the insulators. The railroad wires are carried on a line of wrought iron poles which are let into and supported in the ground by short pieces of cast iron pipe. The remains of some cement poles are to be seen along the line, but they proved too frail, and were not replaced when they broke.

The passenger traffic is divided into first and second class. The first class cars are exactly like our own in every particular and the second differ only in having the seats ranged along the wall instead of at right angles to the long axis of the car. The traveling public is as mixed as it well can be; the greatest number, to put it mildly, are negroid, and there is more than a sprinkling of Chinese. Of the original inhabitants, the Chulo Indians, very few are seen near the line of the railroad, but their blood shows quite plainly in the Colombian skin and hair. The negroes are the happiest and the Chinese the most degraded of their race; the last is probably due to the unrestricted use of opium, which is a government monopoly and a great source of revenue.

At every station there is a police inspection bureau and on every passenger train there are to be seen two or more natty little policemen. They are always neatly dressed, of quiet manners, and are said to be plucky fellows. Although their presence on the trains is unofficial, it ensures the preservation of order and relieves the train-men of much trouble. While nearly every shopkeeper appears to sell liquor, there is little drunkenness and less quarreling. Every male seems to smoke everywhile and everywhere, even in the first class coaches, a privilege which extends to all of the train-hands, including the conductor.

The enginemen and conductors are Americans, while all other train-men are Jamaican negroes. The crews run first-in-first-out and take passenger or freight trains indiscriminately. In the track force there is a roadmaster at the head who is assisted by two supervisors, Americans like himself; all the rest, foremen and laborers, are Jamaicans, and their work will compare favorably with that of our gangs at home. Since the officers are Americans it is natural that the organization shall be American. The sections are five miles long, and every term, phrase and arrangement is exactly like our own.

It must be understood that there is not a highway on the Isthmus; consequently the railroad gets all of the traffic, except such as can walk or be carried by ponies, along the track. There are paths near the stations and trails further back in the country which are negotiable to active men, horses and cattle, but there is not a wheeled vehicle anywhere except at Panama and Colon and so there is not a highway crossing anywhere but at those two points.

Train Accidents in the United States in June.

COLLISIONS.

Rear.

2nd, on Delaware Railroad, near Dover, Del., a freight train ran over a misplaced switch and into the rear of a preceding freight standing on the side track, making a bad wreck, which took fire and was partly burned up. One trainman was killed and four were injured.

2nd, on Wilkesbarre & Eastern, near Stroudsburg, Pa., a freight train ran into the rear of a preceding freight, wrecking the caboose. One brakeman was killed.

3rd, on Burlington & Missouri River, near Alliance, Neb., a freight train ran into the rear of a preceding freight, wrecking the engine and several cars. The engineman was killed and two other trainmen were injured.

4th, on Central of New Jersey, at Saylorsburg Junction, Pa., a passenger train ran over a misplaced switch and into a freight car standing on a side track. The engine was overturned and the engineman was fatally injured.

15th, on Atchison, Topeka & Santa Fe, at Watrous, N. M., passenger train No. 17 ran over a misplaced switch and into the rear of a freight train. Three trainmen were injured.

16th, 2 a. m., on Pennsylvania Lines, near Youngstown, O., a freight train standing at a telegraph office was started in some unaccountable way, while the engineman was in the office, and ran into the rear of a preceding freight. The fireman was crushed in the cab and was fatally burned. The fireman was a new man and said, after the accident, that he supposed the engine was being moved by the engineman.

16th, at Willis avenue, New York City, a passenger train of the New York, New Haven & Hartford ran into the rear of a preceding passenger train of the Manhattan Elevated; two passengers injured.

16th, on Chesapeake & Ohio, at Hinton, W. Va., a freight train standing in the yard was run into at the rear by a following freight, and four cars were damaged. A brakeman was injured.

17th, on Baltimore & Ohio, at Green Spring, W. Va., rear collision of freight trains; one brakeman killed and two other trainmen injured.

20th, 8 p. m., on Louisville & Nashville, at Nolin, Ky., a freight train ran into the rear of a preceding freight, wrecking one engine and several cars. Two trainmen were injured.

23rd, on Mobile & Ohio, near Ramer, Tenn., a freight train broke in two and the rear portion afterward ran into the forward one, damaging several cars. Three trainmen were injured.

26th, 2 a. m., on New York Central & Hudson River, near Buffalo, N. Y., rear collision of freight trains, damaging one engine and several cars. Engineman killed and two other trainmen injured.

27th, 3 a. m., on Southern Pacific, at Shady Run, Cal., the second section of passenger train No. 6, drawn by two engines, ran into the rear of the first section of the same train, badly damaging both engines. It is said that the engineman of the leading engine was asleep.

And 19 others on 15 roads, involving 3 passenger and 30 freight and other trains.

Butting.

4th, 1 a. m., on Atlantic Coast Line, at Gary, N. C., a passenger train ran over a misplaced switch and into the head of a freight train standing on a side track. The baggage and mail cars were badly damaged. The engineman and a tramp were killed and three trainmen injured.

8th, at Louisville Ky., butting collision between an engine of the Louisville & Nashville and one of the Chesapeake & Ohio, both of which were running backward. One engineman and one fireman were injured.

9th, on Chicago, Milwaukee & St. Paul, near Republic, Mich., butting collision between passenger train No. 6 and a freight train, wrecking both engines and a dozen ore cars. A news agent was fatally injured and four trainmen and seven passengers were less severely hurt.

11th, on Chicago & Northwestern, at Des Moines, Ia., butting collision of passenger trains, badly damaging both engines. One engineman was killed and two passengers were injured.

11th, 10 p. m., on Florida, Central & Peninsular, near White Oak, Ga., butting collision between a northbound passenger train and a southbound freight; one engineman and one fireman injured.

13th, on Erie road, near Ontario, O., butting collision between a freight train and a gravel train, the latter being partly on a side track. One engineman and one brakeman were killed.

14th, on Southern Railway, near Belt Junction, Ga., butting collision of passenger trains due, it is said, to the failure of an operator to deliver a dispatcher's order. One engineman and one brakeman were killed and two passengers and five trainmen were injured.

15th, on Buffalo, Rochester & Pittsburgh, at West Falls, N. Y., butting collision of passenger trains, killing one engineman. It is said that in a meeting order delivered to one of the trains the operator wrote "Colden" instead of "West Falls," but in repeating wrote "West Falls." Colden is the customary meeting point for these trains.

23rd, on Pennsylvania road, near Luckett's, Pa., butting collision between an empty engine and a freight train, doing considerable damage. The empty engine having been reversed and deserted, ran back some distance to Cresson. One engineman jumped off and was injured.

24th, 1 a. m., on Louisville & Nashville, at Gibson, Tenn., an excursion passenger train collided with a freight; one engineman injured.

24th, 10 a. m., on Chicago & Northwestern, at Depere, Wis., butting collision between a northbound excursion passenger train and a southbound freight train, the latter drawn by two engines. The freight was backing part of its train into a sidetrack and was almost at a standstill. The passenger train was moving only about 10 miles an hour, but the engine and first two cars of the passenger train were wrecked. Five passengers and one employee were killed and 30 passengers were injured.

27th, on Seaboard Air Line, at Oglesby, Ga., butting collision between a work train and a freight, badly damaging both engines; one engineman injured.

28th, on Norfolk & Southern, near Norfolk, Va., a passenger train collided with an empty engine, doing slight damage. The empty engine having been reversed and deserted, ran back at high speed to Norfolk, where it collided with a passenger car, wrecking itself and the car. The fireman of the empty engine was fatally injured. Two trainmen and two passengers were less severely hurt. The conductor and engineman of the empty engine forgot that the passenger train was due at that place at that time.

And 4 others on 4 roads, involving 8 freight trains.

Crossing and Miscellaneous.

2nd, on Erie & Wyoming Valley, near Jessup, Pa., a freight train became uncontrollable on a descending grade and collided with some freight cars, wrecking the tender and four freight cars. The engineman was injured.

3rd, near Boyles, Ala., collision between a freight train of the Southern Railway and one of the Louisville & Nashville at a crossing, wrecking one engine and three cars. A bystander was killed.

13th, on Delaware & Hudson, near Port Henry, N. Y., a passenger train ran into a freight train standing on the main track, badly damaging both engines. One passenger and 1 trainman were injured.

20th, 11 p. m., on Columbus, Sandusky & Hocking, at Marion, Ohio, collision of freight trains; fireman injured.

22nd, on Plant System, at Pidcock, Ga., a freight train backing into a side track was run into by another freight, and one locomotive was overturned. A tramp was killed.

23rd, at Alliance, Ohio, a passenger train of the Cleveland & Pittsburgh ran into a passenger train of the Alliance & Northern, at the junction of the two roads. The fireman on the last mentioned train was killed and the engineman was injured. Two passengers were slightly injured.

28th, 3 a. m., on Pittsburgh, Cincinnati, Chicago & St. Louis, at Columbus, Ohio, a freight train ran over a misplaced switch and into some empty passenger cars, and several cars were damaged. One trainman was killed and one injured.

28th, on Erie road, near Mill Village, Pa., a westbound freight train collided with a switching engine; one engineman killed.

28th, on Philadelphia & Reading, at Harrisburg, Pa., a freight train ran over a misplaced switch and collided with some freight cars; a fireman was killed and two other trainmen were injured.

29th, on Fitchburg road, at Worcester, Mass., collision between an excursion train and an empty engine; one fireman killed.

And 25 others on 15 roads, involving 8 passenger and 36 freight and other trains.

DERAILMENTS.

Defects of Roadway.

7th, on Chicago, Milwaukee & St. Paul, at Persia, Iowa, a passenger train was derailed and the dining car was overturned and wrecked. Two trainmen and 10 passengers were injured, one of the latter fatally. It is said that the rails had been distorted by solar heat.

12th, on Great Northern, at Summit, Mont., a passenger train was derailed and two engines and four cars fell into the ditch. Eleven passengers were injured. It is said that the derailment was due to a broken rail.

13th, on New Orleans & Northeastern, near Hattiesburg, Miss., a freight train broke through a trestle bridge and 14 cars of coal were wrecked.

19th, on Louisville & Nashville, at Calvary, Ky., a mixed train broke through the bridge over Rolling Fork River and the whole train, except the rear car (a passenger car) fell through. A number of bridge carpenters were at work beneath the bridge; two of these were killed and two other carpenters, two trainmen and four passengers were injured.

And 6 others on 6 roads, involving 1 passenger train and 5 freight trains.

Defects of Equipment.

3rd, on Lake Erie & Western, at Erlin, O., a freight train was derailed by the loosening of a driving wheel tire and the engine and 15 cars were wrecked. The fireman and one brakeman were killed and the engineman was injured.

7th, on Pittsburgh, Cincinnati, Chicago & St. Louis, near London, Ohio, a freight train was derailed by the breaking of a truck, and two cars were ditched. Two trainmen were injured.

9th, on Chicago & Northwestern, near Waupun, Wis., a freight train was derailed by the failure of a journal which became heated, and 15 cars were wrecked. A tramp was injured.

9th, on Boston & Maine, near Groton, Mass., a freight train was derailed by a broken wheel and a brakeman was injured.

12th, on Philadelphia & Reading, near Lofty, Pa., a freight train was derailed by a broken wheel and two cars fell down a bank. Two trainmen were injured.

13th, 4 a. m., on Pittsburgh, Fort Wayne & Chicago, near Salem, Ohio, an eastbound express train was derailed by the breaking of one of the wheels of the tender. The mail car was ditched and three clerks and one other trainmen were injured.

19th, on Pennsylvania road, at Tipton, Pa., a freight train was derailed by a broken wheel and 23 cars were wrecked. A brakeman was injured.

23rd, on New York Central & Hudson River, at Hoffman, N. Y., a freight train was suddenly stopped by the automatic application of the air-brakes and several cars were derailed. On the pilot of the locomotive of another freight train which approached on an adjoining track just as the derailment occurred sat a brakeman who, fearing that he would be thrown into the wreck, jumped off; he fell under the wheels and was badly injured.

29th, on Central of New Jersey, near Ashley, Pa., a freight train was derailed by a broken wheel; one brakeman injured.

29th, on Baltimore & Ohio, near Lodi, Ohio, a passenger train was derailed by the breaking of the engine truck; two trainmen injured.

And 20 others on 20 roads, involving 2 passenger and 18 freight and other trains.

Negligence in Operating.

8th, on Norfolk & Western, at Maybury, W. Va., a freight train became stalled in a tunnel and the men on the two engines drawing the train were overcome by gas, so that they lost control of the train; it ran back down grade several miles and was then derailed. One trainman was injured.

12th, on Galveston, Houston & Northern, at Seabrook, Tex., passenger train No. 6 was derailed at a misplaced switch and the engineman and fireman were injured.

20th, on Alabama Great Southern, near Eutaw, Ala., a freight train ran off the end of the track at an open drawbridge and the engine and 8 cars fell into the river. The engineman fell to the bottom of the river with his engine, but escaped without serious injury. The fireman was slightly injured.

And 13 others on 12 roads, involving 3 passenger and 10 freight and other trains.

Unforeseen Obstructions.

7th, 1 a. m., on St. Louis & San Francisco, near Oswego, Kan., a passenger train was blown off the track by a cyclone and all the cars fell into the ditch. The express messenger and two tramps were injured.

22nd, 2 a. m., on Cleveland, Cincinnati, Chicago & St. Louis, near Foster, Ind., a passenger train was derailed at a washout and three cars were overturned and ditched. The water was two feet deep over the track at the point where the cars lodged. Six passengers were injured.

23rd, 9 p. m., on Southern Railway, near McDonough, Ga., passenger train No. 7 was wrecked at a point where the roadbed had been washed away by a flood. Every person on the train except those in the sleeping car at the rear end was killed. The embankment where the derailment occurred was 40 ft. high. Camp Creek, a very small stream, runs through it by an arch culvert, 20 ft. high and 64 ft. long, with side walls of stone, and arch of brick. It was built in 1888. A cloudburst raised the stream and the water carried the embankment and culvert away, completely. The roadway had been inspected two hours before the disaster. That portion of the wreck which lodged above the water, with the exception of Pullman car, took fire, presumably from the engine, and was burned up. The flames made it impossible to rescue the passengers and employees who were fastened in the wreck.

It would appear that most of the victims were drowned. The sleeping car at the rear fell with the rest of the train, but lodged partly on the bank. All of the 7 passengers in this car were slightly injured. The rear brakeman was also injured, but with great energy climbed up the bank and ran back to McDonough station, reported the accident and then fainted from his injuries. Many of the occupants of the forward car in the train were employees of the road, not in service on the train, but returning home to spend Sunday. Six bodies could not be identified and some of them were not discovered until the next day. Nine passengers were killed and seven injured; seven employees connected with the train were killed, including the Pullman conductor, and one was injured; 11 employees off duty were killed. Two passengers and three employees, including the train porter, known to have been on the train, whose bodies have not been recovered, are not included in the foregoing.

26th, 10 p. m., on Louisville & Nashville, near River Falls, Ala., a work train was derailed at a washout and the caboose was overturned. The flagman was killed and six laborers were injured.

28th, on Missouri, Kansas & Texas, near Eufaula, Ind. T., passenger train No. 6 was derailed and the engine was overturned. Four trainmen were injured. It is said that the derailment was due to a malicious obstruction.

And 5 others on 5 roads, involving 2 passenger and 3 freight trains.

Unexplained.

3rd, on Cincinnati, Hamilton & Dayton, near McGonigle, Ohio, a freight train running at high speed was derailed at a switch and the engine and many cars were wrecked. The fireman, one brakeman and three tramps were killed.

5th, on West Virginia Northern, near Kingwood, W. Va., a passenger train was derailed and three passengers were injured.

11th, on Chicago, St. Paul, Minneapolis & Omaha, near Adrian, Minn., a gravel train was derailed and several cars were badly damaged. A man stealing a ride was killed and two trainmen were injured.

12th, on International & Great Northern, near Trinity, Tex., a freight train was derailed and the fireman was injured.

14th, 5 a. m., on Southern Railway, near Asheville, N. C., an express passenger train was derailed and the two engines drawing it, together with two passenger cars, fell down a bank. One engineman, the baggagemaster and one fireman were injured, the fireman fatally.

27th, on St. Louis Southwestern, near Mount Pleasant, Tex., a freight train was derailed and four cars were ditched. A tramp was injured.

28th, on Missouri, Kansas & Texas, near Hillsboro, Tex., a freight train was derailed and the engine and 10 cars were ditched. The engineman and fireman were injured.

And 46 others on 39 roads, involving 8 passenger and 38 freight and other trains.

OTHER ACCIDENTS.

16th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Birmingham, Pa., a car in a passenger train was overturned by a landslide and five passengers were injured.

28th, on Pennsylvania road, near Philadelphia, Pa., the engine of a freight train was badly damaged by logs which fell from a car in a freight train passing on an adjoining track. The engineman and fireman were severely injured.

And 7 others on 7 roads, involving 3 passenger and 4 freight trains.

A summary will be found in another column.

On "Pure Water for Locomotives by Evaporation."

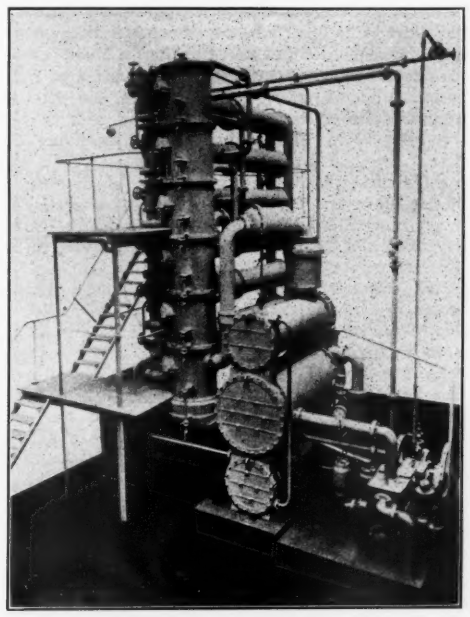
BY C. HERSCHEL KOYL.

The interesting and elaborate article under the above title in the *Railroad Gazette* of June 22d, appears very opportunely. The problem of pure cheap water for locomotives is of such importance and has waited so long for solution that all the information on the subject ought now to be gathered and all the practical plans presented to the railroad world. By "practical" I mean reasonably cheap, and such as purify the water before it reaches the boiler.

There are only two general methods for converting hard or otherwise impure water into soft clean water for locomotive use. One of these is the chemical method by which we take out the impurities and leave the water; the other is the heat method by which we take out the water and leave the impurities. Your paper discusses in an exhaustive manner the heat method and the possibility of providing pure water for locomotives by distillation.

I take it that "possibility" is the word to use, because the only conditions presented by you under which pure water can be procured by distillation at a price at all comparable with the cost of water made soft and clean by chemical treatment, require the price of coal to be about 25 cents per ton, and the distilling apparatus to have an evaporative efficiency of about 100 lbs. of water per pound of coal; while the actual state of affairs is that in the bad-water districts coal cannot now be procured for less than four or five times 25 cents per ton, and that the best evaporators do not give one-half of 100 lbs. of water per pound of coal.

The distilling plant in the ship Iris of the United States fleet (referred to by you), reported upon by Passed Assistant Engineer W. W. White, U. S. N., in *Cassier's Magazine*, November, 1898, was said at that time to be furnishing 16 lbs. of distilled water per pound of coal, but later and more extended tests have shown an available output of less than 13 lbs. of water per pound of coal, if my memory serves me right. The distilling plant at Fort Jefferson, Dry Tortugas, Fla. (also referred to by you), reported upon in the February number of the *Journal* of the American Society of Naval Engineers, by Lieutenant R. K. Crank, U. S. N., gives about 21 lbs. of distilled water for every pound of coal burned in the boiler, but 7 pounds of this comes from the live steam of the boiler and must be returned to the boiler, leaving a net product of 14 lbs. of distilled water available from the combustion of one pound of coal. It is necessary to make this deduction in computing the net result, for, of course, if a distilling plant is established in a place where there is only bad water, either the live steam from the boiler must be kept in a closed circuit and returned to the boiler without loss (therefore evaporating less than the maximum amount of water per pound of coal), or the live steam must be used as at the Dry Tortugas plant to mix with the other vapor and run into the distilled storage tank (whence it is returned to the boiler), and this amount must be afterward deducted to give a true statement of the available amount of water evaporated.



Yaryan Multiple Effect Evaporator—Perim Coal Co.

Lieutenant Crank was able to get 7.6 lbs. of water per pound of coal by direct evaporation from the boilers. Another boiler and better coal might have given him 8 lbs. or 8½ lbs. of water. But it is to be remembered that since the heat in 1 lb. of coal may be taken for ordinary purposes as 13,000 heat units, and since 1 lb. of water at say 58° F. requires for its heating and evaporation 1,120 heat units, it is useless to expect the direct evaporation of more than 12 lbs. of water from the combustion of 1 lb. of ordinary coal, even under ideal boiler conditions.

It is not by increasing the efficiency of the boiler that the increased evaporation from 1 lb. of coal is produced. It is by utilizing the heat in the steam to evaporate other water at lower temperature while the steam is being condensed, utilizing this again to evaporate still other water at a still lower temperature, and so on until the available heat is exhausted. It is really a brilliant mechanical trick, beating nature at her own game.

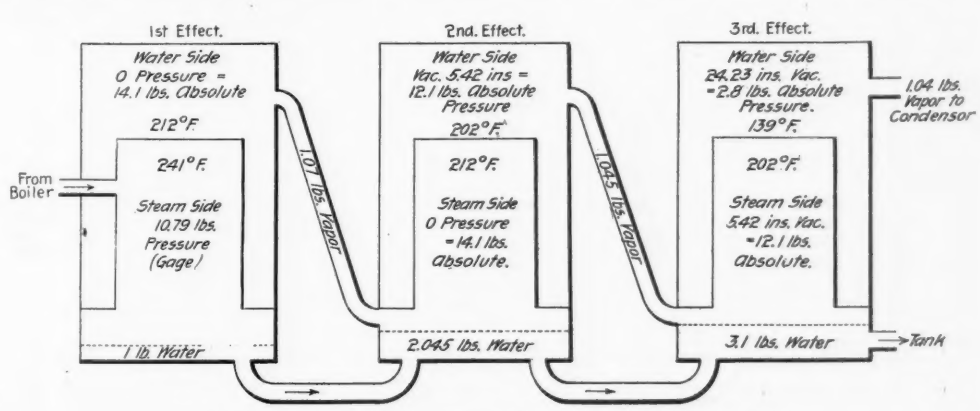


Diagram to Illustrate the Theory of Multiple Effect Evaporators.

One of these multiple effect evaporators is nothing but a series of surface condensers. If one imagines a surface condenser so operated that there is less weight of cold water upon one side of the tubes than of steam upon the other side, it is easy to see that the condensing water may be converted into vapor while some of the hotter steam is being condensed into water; and that this second vapor or steam may be sent through still another condenser where in the same manner it may be used to evaporate a still smaller quantity of water, and that this third vapor or steam may be sent through still another condenser to evaporate a still less quantity of water, and so on until the amount of effective vapor is infinitesimal.

Another way of looking at it is to imagine an amount of condensing water equal in weight to the amount of steam, converted into vapor at a lower temperature and pressure than that of the steam; and this second vapor used to convert another equal amount of condensing water into still other vapor at a still lower temperature and pressure, and so on until the temperature is too low for further use.

It makes no difference which way we look at it, but the point is that in each operation there is a loss of energy, and the amount of energy lost in each operation divided into the total available energy of the original steam determines how many times the operation may be repeated and therefore how many pounds of water may be evaporated by the original pound of steam. I enclose a diagram, copied from Lieut. Crank's article, to illustrate the theory of multiple-effect evaporation.

In the plant at Dry Tortugas the steam begins its heating work at a temperature of 348° F., is reduced by preliminary heating work to 240°, is reduced by the first effect evaporator to 212°, by the second effect evaporator to 202°, by the third effect evaporator to 140°, and by a final surface condenser to 109°; thus showing in preliminary operations a drop of 108°, in the first evaporator a drop of 28°, in the second evaporator of 10°, in the third evaporator of 62°, and in the fourth condenser of 31°, or a total drop in temperature of 239° F., of which 100° are lost in the three evaporators proper, or so-called "effects."

It is this last—this drop of 100°, from 240° to 140°, in the three evaporators—which concerns us in a discussion of the possibility of getting cheap locomotive water by multiple effect evaporation. The energy in one pound of steam at 240° F. is greater than the energy in one pound of steam at 140° F. by only 30 British heat units, and when these 30 heat units per pound of steam have been dissipated by the inevitable losses of convection and radiation due to the slow heat conduction from the steam side to the water side of the evaporator tubes, the available heat is exhausted. In other words, there is of necessity a difference of temperature and pressure between the incoming and outgoing—the active and resultant—vapors in each evaporator and this difference of temperature divided into about 100° determines again the number of evaporators possible, and, therefore, the number of pounds of distilled water which may be procured from the condensation of one pound of boiler steam.

I have referred to these two plants particularly because they are mentioned in your article, but a much better illustration of the process than either of them is found at the works of the Perim Coal Co. on the Red Sea, where a system of Yaryan multiple effect evaporators is turning out nearly 36 pounds of distilled water per pound of coal, using six evaporators in series, and where, if the price of coal were $1.25 per ton, the total cost of distillation would be approximately 30 cents per thousand gallons. This plant (the best in actual use in the world) was reported upon very fully by the committee of the Master Mechanics' Association at the meeting of 1899, and noticed by you in the sentence "But this was a year ago." I enclose you a photograph of the plant sent over by the British Yaryan Co.

At this day the utmost refinement of construction has enabled us to utilize only seven evaporators in series and to get with the best of boilers and the best of coal only 44 pounds of distilled water per pound of coal. Every effort has been made to spray the condensing water upon the hot tubes so that the vapor may escape from the water easily, to cover the machines so as to prevent heat losses, and to reduce in every way the difference in temperature necessary between the inside and the outside of the tubes. But this reduction of heat losses is like the reduction of friction; in practical machines it has its limits.

It must be remembered too that scale is formed in these evaporators just as it is in an ordinary boiler, and that the best of them must be shut down one entire day per week for cleaning purposes. This makes a material difference in the yearly output of the machine.

I do not write in criticism of your instructive paper, but in criticism of the inference to be drawn from it—that it is time we set about supplying locomotives with pure water by distillation. It is so much easier and so much cheaper to extract the scale with all the mud, free alkali or free acid and other impurities by chemical means, while the water is cold and before it goes to the boiler, that it seems the part of wisdom to use this simple method. It is almost impossible to find a water in the United States which would cost as much as 15 cents per thousand gallons for purification by the chemical method; it is almost impossible to imagine conditions under which

pure water could be procured by distillation for so little as 15 cents per thousand gallons.

Last year a committee of the Master Mechanics' Association presented a most complete and exhaustive review of the different methods in use for preventing the evils of impure water in boilers, and these are some of their recommendations:

1. Make every effort to find good, natural water.

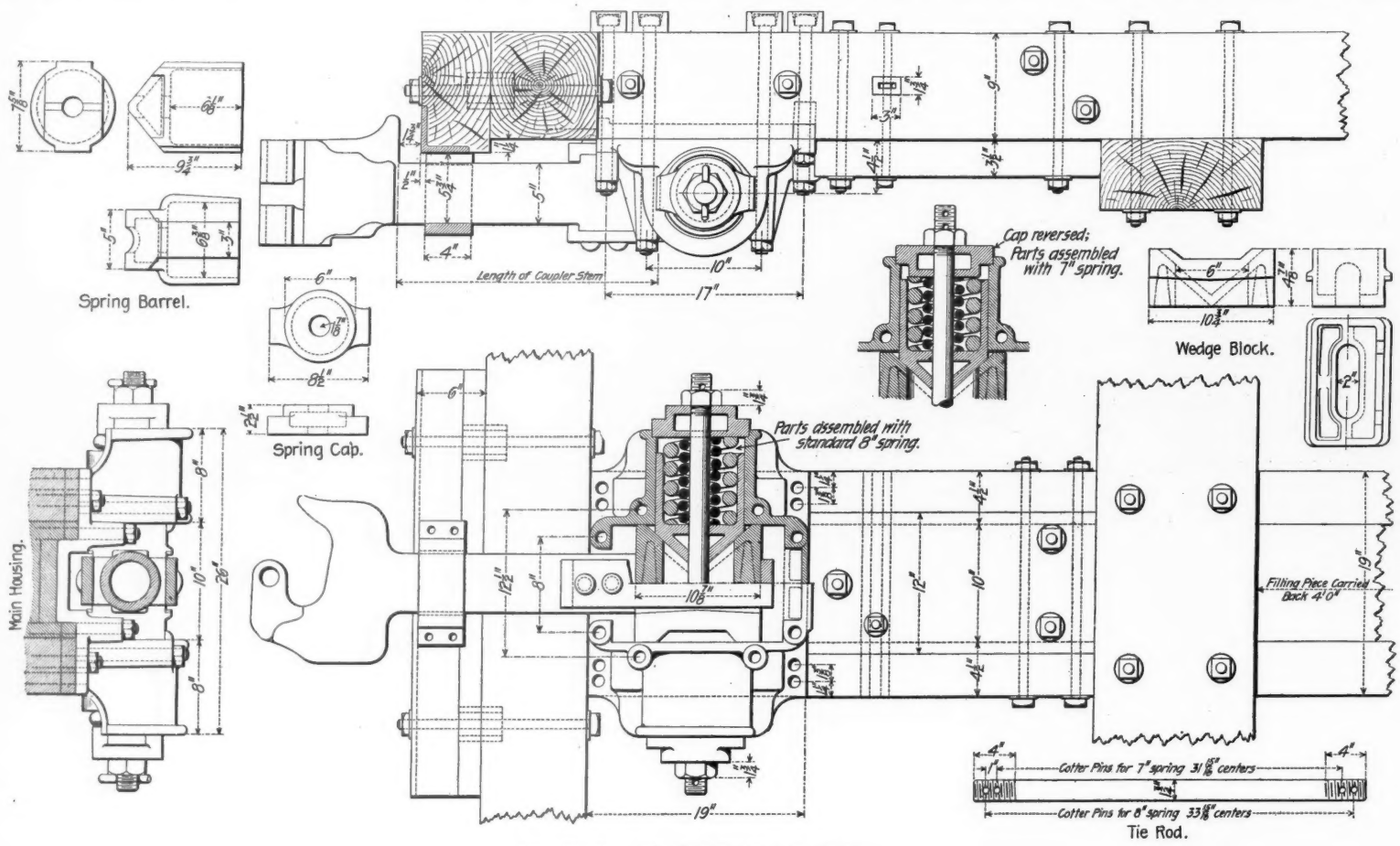
2. If you cannot get this, then soften hard water by chemical means; it costs only four or five cents per thousand gallons; the cheapest and best reagents for the purpose are fresh lime and sodium carbonate, and they are harmless.

3. If you cannot get good water in any other way, then distil, but the cost is so great that only under the most aggravated bad water conditions should this method be considered at all.

I hold that this committee, in this report, maintained the reputation of the Master Mechanics' Association for getting at things in a practical way, and I hold that the only occasion on which one should resort to distillation for this purpose is in the case of water, like sea water, heavily charged with common salt which does not submit cheaply to extraction by chemical means.

The Sessions-Standard Friction Draft Gear.

The requirements for a draft gear that will meet and endure the exactions of modern railroad traffic have long challenged mechanical ingenuity, and it is with much satisfaction that an illustrated description of the Sessions-Standard friction draft gear is here given. Patent claims for the Sessions-Standard were filed by its inventor, Mr. H. H. Sessions, April 19, 1900. Notice of patents allowed was given May 26. Letters patent were issued July 17, and subsequently assigned to the Standard Coupler Company, New York.


Spring Barrel.
Length of Coupler Stem
Cap reversed; Parts assembled with 7" spring.
Wedge Block.
Spring Cap.
Parts assembled with standard 8" spring.
Main Housing.
Filling Piece Carried Back 4' 0"
Cotter Pins for 7" spring 3 15/16" centers
Cotter Pins for 8" spring 3 3/8" centers
Tie Rod.

The Sessions-Standard Friction Draft Gear.

Briefly, it is an assemblage of two M. C. B. standard 20,000-lb. draft springs; two wedge-pointed barrel castings, in which the springs are encased; two wedge castings, of general rectangular outline, which, when placed back to back in a standard M. C. B. coupler yoke, practically form two double wedges, joined at their points, the greatest face depression of the castings being therefore at their mid-length; two reversible spring caps; one through bolt; and one malleable iron housing casting. The housing casting is placed where the draft timbers ordinarily are and dispenses with their use. A very desirable additional feature of strength for center sills and under structure is shown in the illustration as an oak filling timber taking up the width between center sills and, in this case, extending 4 ft. beyond the transom. The housing casting has strong lips deeply gained into the center sills and filling timber. It is also reinforced at the back by a thrust timber, and is bolted through the sills in the manner shown. The views in which this construction is apparent are the inverted plan, the side elevation, and the sectional views in the group illustration. By the reversal of the spring caps, springs either 7 or 8 in. long can be used.

The ease with which the parts may be assembled in applying draft gear to the car, and the readiness of access in repair, are salient features. By the removal of one cotter-pin and nut from the tie bolt, and the withdrawal of the bolt, the springs and barrel castings are made free in the housing and can be lifted out without resistance. The tail end of the coupler then drops free of the housings, and, if necessary to remove the coupler, the loosening of the carrier iron only is required. The wedge blocks rest, an easy fit, in the tail yoke, and are readily taken out or replaced. The replacement of a broken part, singly, or of all parts that compose the draft gear, except the housing, can be made in ten minutes. The work comes within the ability of any competent car repairer, and requires no tools but a hammer and wrench. In case of the failure of one draft spring it is apparent that the remaining spring would continue to work, pressing the straight face of the disabled wedge-block against the housing. In event of the failure of both springs, the stop-points of the housing, and the tie-bolt, stand guard against a break-in-two.

It is evident that the spring power is exerted at right angles to the line of pulling or buffing force, and that the entire application of frictional resistance is made to conform to that idea. The housing casting, receiving the drawbar yoke centrally, has cylindrical openings of a size to pass the spring barrels freely on raised guide surfaces which they bear, and which rest in suitable side slots in the housing cylinders. The pull or buffing load is taken directly upon the wedge planes. The wedges are, therefore, prime movers in the operation of train haul or buffing and the springs are always in secondary action. The stops are integral with the housing. The angles of friction planes of the tail yoke wedge blocks are 40 degrees to a right line drawn with the length of the coupler. The inward projections of the spring barrel castings have the residual angles that complete a right-angled action. The device, in operation, utilizes the principles of a double wedge, driven by the force of pulling or buffing, and opposed by the normal resistance of two standard draft springs, plus the friction of the wedge faces and the friction of the barrel castings in the housing casting. The retarding effect is intensified or lessened as the angles are made more obtuse or more acute.

The first test of this equipment was made at Bridgeport, Conn., with a steam cylinder and a system of levers that developed an initial working force of 68,000 lbs. It was found by applying this power to the draft gear, in quick reversal, that the capacity of two standard springs could not thus be exhausted. A drop test was made, to approximate average yard service, with an ordinary twin spring arrangement, and with the friction gear, and a test attempting to destroy the latter device was made in a railroad yard. In the drop tests, a given weight and equal heights of drop gave results in compression and recoil, as shown in the table, the same springs being used in all trials of both devices.

Compression and Recoil: Equal Weight and Heights of Drop.

	Two Standard M. C. B. 6¼ × 8 in. draft springs.				The same springs in Sessions-Standard.		
Test number	Spring compression, in.	First recoil, in.	Second recoil, in.	Third recoil, in.	Spring compression, in.	First recoil, in.	Second recoil, in.
1	1¼	9	5	1½	½	¾	0
2	1½	13	6	2	⅝	1⅝	0
3	1¾	20	10	3	¾	2½	0

The springs, when tested on an Olsen spring-testing machine, showed about 20,000 lbs. for 1¾ in. compression, based on an average of seven tests, ranging from ¼ in. to 1¾ in. compression. The springs closed at 1 15-16 in. The average of six compressive tests of the Sessions-Standard device, to the limit of the spring-testing machine, was 11,567 lbs. for each eighth of an inch compression of springs. This gives a total value, in progression, of about 162,000 lbs. resistance, in a range of 1¾ in. spring compression under steady pressure. It is apparent from these figures that with a given spring power, in steady compression, the resistance offered by the friction device is about four times that of the plain springs, in twin arrangement. Under impact, as indicated by the register of compression by drop tests, this relation would change in some fixed ratio to velocity, modified by the conditions of contact and the value of recoils. It is clear that the spring power is greatly husbanded and the resistance enormously enhanced under both conditions.

The yard test earlier referred to was made in the Portsmouth yards of the Seaboard Air Line, July 13. By the courtesy of Mr. W. T. Reed, mechanical superintendent of the railroad, a member of the staff of this paper was present. The Sessions-Standard draft gear was applied to one end of a 40,000 lbs. capacity flat car. To the other end of this car, where ordinary single-spring draft gear was used, two locomotives, having a combined tractive force of 31,000 lbs., were coupled. Sixteen loaded cars mixed box, flat, and gondolas, were switched out upon the line, the air was set hard and the wheels of the first car were blocked with wood. First in the train was a box car loaded with lumber. The couplers were first set to give a recoil without locking. The flat car was drawn away about two car lengths and both engines were reversed in full valve motion with throttle enough to give a collision speed of approximately 8 miles an hour. The ordinary draft gear was driven full home and the coupler horn made a deep impress in the deadwoods. The Sessions-Standard gear, having been set to clear 2 in. between coupler horn and deadwood, was not driven back to contact between those points. The train stood fast and the flat car and two engines recoiled 18 in. on the track. The couplers were then set to lock. The flat car was drawn away a trifle farther than in the first collision. The operation was repeated, the striking speed being not less than 9 miles and probably above 10 miles per hour. The coupler horn of the ordinary gear sank about ¼ in. into the deadwood. The horn of the friction-geared coupler made a very slight surface impress. There were two distinct recoils that first drew the plain-spring coupler out to the full travel of its spring, and then drove it home a second time. There was but slight movement observed in the recoil of the friction device. The engine throttles remained open during impact and surging. The blocked wheels of the box car were skidded about 6 in. on the rail and its load of lumber was shifted sufficiently to thrust the end out of the car, leaving a vertical rift in the car siding, 2 in. wide. When surging had ceased, the

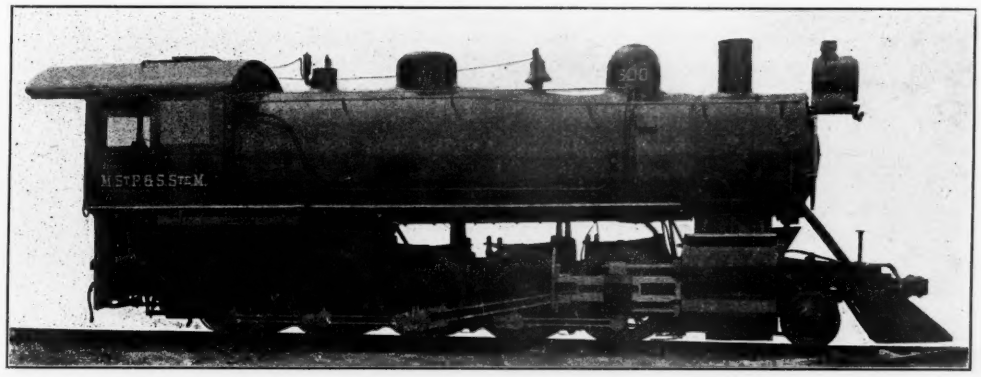
coupler horn of the plain spring-gear was hard against the deadwood and the coupler horn of the friction gear stood about ¾ in. from the deadwood, with both engines still reversed and under steam. Continued, steady, effort failed to reduce this clearance. With the slack of the couplings, between engines and first car, and between first and second cars, repeatedly taken, to gain thrust, the coupler horn of the friction gear could not be driven closer than ½ in. from the deadwood of the flat car. Left standing in this position after last effort, and with steam shut off, without reversing, the friction gear forced the flat car and the two engines ahead, but so slowly as to be imperceptible except as observed by the movement of the shank of the coupler upon the carrier iron. The friction gear was thus restored to its normal position.

These tests were repeated, with quick reversing of the engines and increasing severity, until the flat car was bowed about 4 in. upward at the middle, and was butted partially out of the truck center-plates, with no comparatively different result to the draft gear. Punch marks set at measured distances in various sections of the housing casting showed no distortion of the casting after the test.

The design is remarkable, alike for its simplicity and for its reception. There is, however, an opportunity for interesting study in the absorption of power by this device. The Seaboard Air Line is having 300 new cars, now building at the South Baltimore Car Works, equipped with it, and has placed reserve orders for more, to be put on cars now in use or undergoing repairs on the line. Orders have been received from five railroad companies for various numbers of the friction draft gear.

The Soo Line Compound Decapod.

In our issue of June 22, page 429, appeared a description of a compound decapod locomotive recently built by the Baldwin Locomotive Works for the Minneapolis, St. Paul & Sault Ste. Marie. This engine has been completed and we are now able to give an engraving from a photograph, the illustration last June having been from the erecting card. The weight of the engine is actually somewhat less than we gave at that time. The weight on the scales, in working order, with three gages of water, but without fire or men, is 207,210 lbs. Of this 184,360 lbs. is on the drivers. The tank has a capacity for 7,000 gallons of water and nine tons of coal. The engine is guaranteed to haul 2,000 short tons, inclusive of engine and tender, up a grade of 42 ft. per mile (exclusive of the resistance of curves) at a speed of six miles an hour. The cylinders are 17 and 28 x 32 in., the boiler 68 in. diam., the working pressure 215 lbs., the total heating surface 3015.7 sq. ft. and the grate area 37.5 sq. ft.



Compound Decapod Locomotive for the Minneapolis, St. Paul and Sault-Ste Marie.

Trusts and the Engineer.

At the regular meeting of the Civil Engineers' Club of Cleveland, May 8, Mr. Charles H. Wright read a paper on "Trusts and Their Relation to the Engineer." He considers the origin and the nature of the trust at some length, which portion of his paper we do not reprint. Below will be found, however, a few extracts from his remarks which bear especially on the relation of the engineer to the trust. The paper is printed in the June issue of the "Journal of the Association of Engineering Societies."

As you know, there has recently been formed a combination of the bridge builders. At first glance it looks as if this trust must have a disastrous effect upon many engineers. As we look more closely the county commissioner appears to be about the only one hurt, and perhaps engineers will not feel called upon to worry about the county commissioner.

Those of you who are bridge engineers do not need to be told that a very great saving can be brought about in the management of the bridge companies by the consolidation of the competing plants. Where perhaps twenty designs and estimates were made for the same work under the separate management, only one or two are necessary when the different plants are united. This seems to point to a reduction in the number of engineers employed. So far as the bridge companies are concerned, this is probably the case. There is another side, however.

The cream of the structural work comes from the railroads. At present, by simply asking for bids on certain work the railroads get the benefit of the knowledge and experience of the engineers of the several bridge companies asked to bid. It cannot be expected that the same number of designs will be submitted by the trust. On the other hand, the railroad engineers will hardly accept without question whatever may be offered by the trust. A certain amount of preliminary designing must be done. If the trust decides that it will no longer maintain a free engineering bureau, the railroads will be compelled to do this work themselves. Many of them are already doing it. If they take the wiser course and turn this work over to the engineering firms who make a specialty of this work, a long step will have been taken in the direction of economy, good design and sound common sense. The men who have gained knowledge and experience by years spent in the offices of the bridge companies will find plenty of opportunities, either with the railroads or in the office of the expert.

Incidentally, it might be remarked that the bridge trust itself has not a pathway strewn with flowers ahead of it. As stated above, the most desirable work comes from the railroads. Does any one imagine that the railroads will allow the bridge trust to dictate prices to them? When prices reach a certain point the railroads will build their own bridges. Some of the larger companies are in a position to do this at any time. It will be interesting to watch developments in the bridge trust for the next year or two.

The American Steel and Wire trust for a little time has bid fair to rule a certain line of manufacture. Now the construction of new and independent mills is probably a certainty, and it is not probable that the new plants can ever be controlled by the wire trust. This means very much to the engineers. The new plants must be the most perfect that ever have been erected. The ability and the genius of the inventive engineer will be taxed to the utmost. Consider for a moment how far-reaching this single new interest will be in its effects. Engineers in every branch will find opportunities here. If the new supply exceeds the demand, it simply means that new uses will be found for these materials; there is a vast field yet open in this direction.

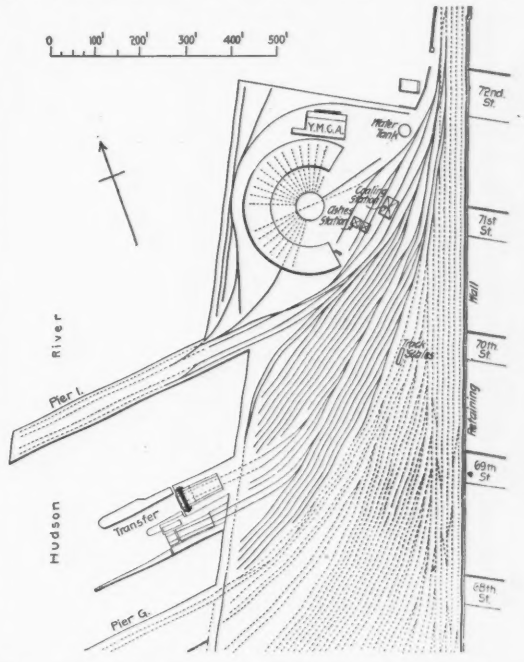
At one time the ore and coal shipped from the great lake ports was handled by laborers; then came the machines for handling these materials, and the laborers lost their employment. The increased economy in handling combined with other causes, increased the production of iron and steel, and many more men were soon required than had been replaced by the machines. Perhaps the new requirements were for a higher grade of labor, but there is no law against the laborer fitting himself to do a higher class of work. The country is full of opportunities for men to obtain an education and a training for better things. When the dock laborers were replaced by the machines, skilled machinists, draftsmen and engineers were required to build the machines. New boats and new lines of railroads were built to transport the raw materials and the finished products. New furnaces and new mills were built. New machines and new devices for the economic handling of material at the mills and furnaces were required, and an endless line of improvements followed all through the iron and steel industries and the allied lines of manufacturing. All this gave employment to the engineer.

No truth seems harder for the American people to understand, and yet no truth is susceptible of more perfect demonstration than is the fact that any advance in the industrial world which cheapens the cost of production or increases the possible output is in the end a direct benefit to all classes. The world always has been, and always will be, a hard one for the aged and the incompetent. We all realize and regret this, but is it advisable to limit the speed of all to the capacity of the most feeble?

A well-known engineer recently tried to prove that the reason there were more and better engineers to-day than twenty years ago was because the engineering schools were turning out a better grade of engineers. While it is true, to a certain extent, that the engineer creates his opportunities, he will not make a much better showing than the physician unless he have the help that great wealth alone can give. The engineer, more than any other professional man, requires the backing of capital. The trust is in the position to give this all-important aid.

Reconstruction of the New York Central Freight Yard at Sixty-ninth Street.

The Hudson River freight yard of the N. Y. C. & H. R. R. R. extends from Sixtieth to Seventy-second streets, New York City. The plant includes an elevator, six piers, a transfer dock and engine house, with the usual minor structures, and has a large storage capacity for freight cars. That portion of the yard from about Sixty-eighth street up is being partially rebuilt. The changes will include an additional slip at the transfer dock, doubling its capacity, the construction of a new coaling station and ashes station, and a total rearrangement of the tracks, which will facilitate the switching and incidentally will add considerably to the storage capacity.



New York Central Yard at 69th Street, New York City.

NOTE:—The solid lines show approximately the rearranged and new tracks; center lines only are shown.

The local conditions interfere with anything like an ideal arrangement for a yard, and the plan adopted is only considered as the best under the existing conditions. A study of the plan will show the freedom with which the various tracks on the piers and transfer docks may be approached from the main track, and how the remaining space has been ingeniously utilized for storage tracks.

The Trans-Siberian Railroad.

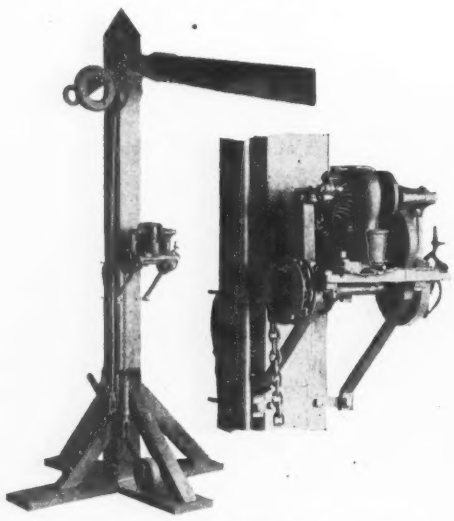
The British Commercial Agent in Russia has recently prepared a report on this railroad. Mr. Cooke's object was to review the enterprise purely from its commercial aspect, both as regards Siberia itself and the influence of the line on international intercourse generally. The report is summarized in the London *Times* as follows:

"Mr. Cooke first describes briefly the condition of Siberia now, and then passes on to trace the chief incidents in the history of the line, the original scheme, the delay and alteration caused by the all-important addition of the Manchurian line, which was engrafted upon it subsequently, the feeder lines and connecting waterways, and the volume of passenger and goods traffic so far. At present the line is practically ready, though much relaying and reconstruction may at any time be necessary, from Moscow to Samara, Cheliabinsk, Omsk and Irkutsk to Kaidalovo, whence it turns off to Nagodan on the Chinese frontier. The distance from Moscow to Kaidalovo is 4,146 miles, with a break of about 40 miles to cross Lake Baikal, while nearly 200 miles around Lake Baikal is at present only projected. The 216 miles between Kaidalovo and the Chinese frontier are building, as are the 636 miles on through Manchuria to Khaorbin or Harbin, and the 653 miles thence to Port Arthur by Mukden. Four hundred and eighteen miles of the line from the Vladivostok end were opened in 1897, and the remaining 383 miles to the great junction at Harbin are now in process of construction. The traffic so far has been fully up to expectation, both as regards goods and passengers, and the probabilities of future traffic are, in Mr. Cooke's opinion, equally favorable. 'It will unite in direct through communication, on the one side, the teeming millions of Russia first and then of Europe, and, on the other, the 450,000,000 of Chinese and Japanese and all the possibilities of international trade that these various nationalities represent. The railway administration counts on obtaining the international mails between Europe and East Asia, a large proportion of heavy shipping freight cargoes, perishable commodities and goods deliverable by a fixed date. Add to these the passenger and immigrant movement, the internal traffic of Siberia itself, the increasing number of local feeding lines, and all the possibilities called up by the future working of the abundant coalfields of the adjacent districts, and it is evident that this single track light-railed line as at present laid will have in the near future, as it has already had, considerable trouble in coping with the demands on its conveyance capacity. Grain, the chief mainstay of Siberian export trade (unlike the tea traffic expected from China, compact and capable of high freight), is cheap and cumbersome. Apart from commercial considerations, too, the constant conveyance of troops and transport possible at any time cannot be left out of account.' As to competition with existing modes of reaching the Far East, Mr. Cooke gives the details of Russia official calculations on the subject. In effect they come to this: The journey from London to Shanghai can be made by the Siberian line, when it is

completed, in 16 days for £33 10s. first class, or £21 second class. The voyage now occupies 34 to 36 days, and costs £68 to £95. The 'trains *de luxe*' which now leave Moscow every Saturday evening for Irkutsk are described by Mr. Cooke as the most luxurious trains in existence. The report then deals in succession with the cost of the line, immigration, through transit trade, the trade with China, agriculture and the grain trade, cattle and butter, timber, fuel, coal, the gold industry, the lack of industries in Siberia, foreign enterprise there, and, lastly, openings for British trade. As to the last, Mr. Cooke puts machinery in its widest sense as presenting the largest opportunity for the expansion of the trade of this country with Siberia, manufactured goods of all kinds, especially the simpler luxuries and the necessaries of life. For all over Siberia 'villages are springing up into thriving towns, and hitherto sleepy townlets into busy trading communities. . . . Once unknown villages, or relatively unimportant towns, have suddenly leapt into world-wide prominence, each to play its part in the commerce of East and West. For much that is wanted all around they have already, to some extent, applied to the United Kingdom, but in general British traders must go to them. The field, then, is before British enterprise, and, in spite of some stiffish natural obstacles, and considerable artificial hedging and fencing, there is no reason why it should not run through, if not ahead, at least abreast of Continental and Trans-Atlantic rivals."

Electric Interlocking at Fremont and Genoa, Ohio.

The Taylor Signal Co., of Buffalo and Chicago, has lately installed interlocking at two crossings of the Lake Shore & Michigan Southern where the main line of this road is crossed by an electric railroad. A diagram of one of these crossings is shown herewith, together with photo-



Interlocked Signal for an Electric Railroad.

graphs of the motors which are used to work the derailing switches, a signal motor, and one of the signals used on the street line. These crossings are at Fremont, Ohio, and Genoa, Ohio.

The home signals on the Lake Shore road, D and D¹, stand normally at clear, and the distant signals, E and E¹, likewise. These home signals are each 600 ft. from the crossing and the distant signals are 1200 ft. from the home. The dwarf signals, F and F¹, on the street railroad, stand normally at "stop," and the derails which are situated near these signals stand normally open. The other derails, C and C¹, are normally closed. A train approaching on the Lake Shore road traverses a rail circuit from a point 500 ft. outside of the distant signal and 2,300 ft. from the crossing. After it passes this point its presence on the rails locks signals F and F¹. When this lock is released, that is to say, when no train is approaching, the signalman at *A*, after admitting an electric car to the point where the car is shown in the drawing, sets signals D and D¹ and E and E¹ against approaching Lake Shore trains. This in turn closes the crossing derail and opens the outlying derail on the electric line. The object of the outlying derail is to prevent conductors on the electric line neglecting to restore the signals on the Lake Shore to safety after they shall have passed over the crossing. It will be seen from the diagram that after the crossing is passed the crossing derail is first encountered, which is closed, but as the corresponding outlying derail is open before the car can proceed the main line signal must be cleared and this in turn closes the outlying derail.

When a signalman goes off duty he connects the controlling circuits to hand key boxes situated near the derails B and B¹, on each side of the crossing, and these derails and the signals are then operated by the conductors of electric cars.

The controlling circuit closers in the cabin have the Taylor interlocking apparatus, by which the display of conflicting signals is made impossible.

Merchandise on Electric Railroads.

In some senses the most interesting feature of the last few years' development in electric railroads, whether in public streets and highways or on rights-of-way through private property has been the large proportion of what may be called long-distance or interurban lines; and coincidently with this phase of development, or as a result of it, has been the introduction of freight and express cars. A railroad track of any kind, light or heavy, broad or narrow, when laid through a territory before dependent on wagon roads alone, becomes a great improvement the moment it is finished, and the need of the people of such territory for a common carrier—a company offering conveyances which will carry anything susceptible of transportation—is at once apparent. Whatever purpose the road may have been built for, *some* demand for merchandise transportation at once arises.

In view of these obvious conclusions it is somewhat surprising that freight or express cars have not been introduced on street and country electric lines much more rapidly than they have. But whatever may have been the past attitude of such companies it is evident that within the last few months the opportunities of doing useful and profitable service by running freight and express cars have been much more generally recognized and reports that this department is to be fostered by this or that company are now heard frequently. In making inquiries as to the extent of this movement we have not secured much definite information; and some that we have secured is not in shape for publication; but some of the notes which we have received are, nevertheless, worth putting on record, and we give them below. Taking a half dozen cities at random we shall see that the prospects of a considerable development are worth attention.

Anderson, Ind.—The Union Traction Company, operating electric lines between Anderson, Alexandria, Elwood, Marion, Muncie and Indianapolis, runs express cars on a number of its lines, and the express department is growing rapidly.

Birmingham, Ala.—The Birmingham Railway & Electric Company has been doing some freight business on its interurban lines for two years or more, and the receipts from merchandise have been $1,000 a month and higher.

Buffalo, N. Y.—In Buffalo we find the Buffalo, Hamburg & Aurora line about to open for business with freight cars which will make probably three trips every day.

Chicago.—The Chicago & Milwaukee line has been doing an express business for about a year between Evanston and Waukegan, and it is believed that a good demand will be developed, although the business is yet small.

Cleveland.—Cleveland, as is well known, is the diverging point of a number of long electric lines. The Cleveland & Chagrin Falls electric road has carried freight and express for three years, and the business is still increasing. East of Chagrin Falls this line does not compete with any steam road and the business is likely to be enlarged. We judge that the company intends to make "rates which will move the traffic."

The Cleveland & Eastern, which has 55 miles of line, carries all kinds of freight, including coal, feed, lumber and other heavy merchandise. The business has been running but a few months, but it is increasing rapidly. The company has three freight stations and will soon have two more. Most of the country through which this line passes has never before had convenient communication with markets. The road has only three or four cars of its own which are devoted to merchandise, but its income from this department has been about $3,000 a month.

The Electric Package Company of Cleveland does express business over four different roads centering in that city, its functions being the same as those of the old express companies. This concern has been running two years, and its business is increasing.

Dayton.—The Dayton & Xenia Traction Company, with 32 miles of line, has begun freight and express business since the beginning of the present year. The volume of traffic is constantly increasing.

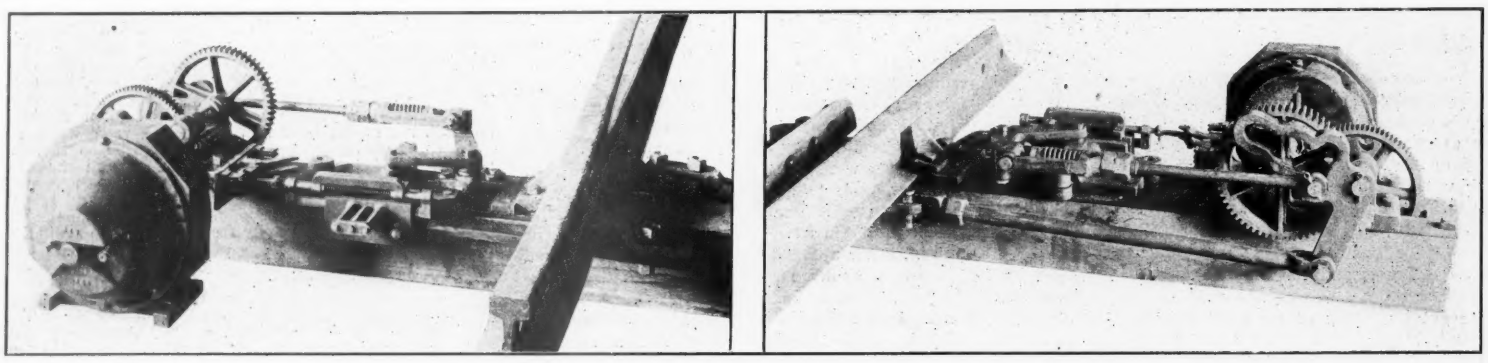
Detroit.—The Detroit, Rochester, Romeo & Lake Orion, operating 55 miles of line and building 40 more, has lately begun to carry merchandise on a small scale, but expects to increase the business rapidly. There are many towns on the line which have no other good connection with Detroit, and the public demand for freight accommodations is very strong. The Detroit, Ypsilanti & Ann Arbor, 54 miles long, has been doing for some months all of the freight business that it is prepared to handle and indeed has not been anxious to stimulate that business at present. Packages are loaded in the open street in Detroit and distributed anywhere along the line as required. The Detroit & Northwestern has 31 miles of single track and 29 miles which is double track. About 21 miles of this is on private right-of-way, abutting on the highway. This road is doing a small freight business and has recently hauled 100 carloads of logs from points along the line, delivering them to the Pere Marquette. The road also carries milk as well as package freight and has freight houses at Detroit, Farmington, Northville and Pontiac, presumably very small but sufficient for present business. This freight business has only begun on this road within three or four months and the road is not yet prepared to handle what comes to it. There are six suburban electric railroads running out of Detroit, all of which we believe do some freight business, which is a great convenience to the country merchant, who can telephone in and within two or three hours get his goods at his store door.

Youngstown.—The Mahoning Valley Railway, operating 38 miles of line, has five freight stations and has been doing a light merchandise business most of the time for three years. The experiment was intermitted for a time, but there was a strong demand for its resumption and the company now intends to extend the freight service to towns which have not before been accommodated.

Pneumatic Foundations in New York.

In our issue of Dec. 9, 1898, page 877, appeared a description, with illustrations, of the cylindrical wooden caissons and the air lock designed and patented by Mr. John F. O'Rourke and used by him in sinking foundations for buildings in New York. He has recently finished a work in which caissons of this sort were used and which is particularly interesting, not only because of the magnitude of the work but because of the speed and success with which it was carried out. He put in the foundations for the 18-story steel frame office building of the Atlantic Mutual Insurance Company on the corner of Wall and William streets, New York city. This building is about 143½ x 78 ft. and Mr. O'Rourke's contract was for 42 caissons and the cylindrical piers built in them to the cellar floor level. The contract time was 60 days and the work was finished in 36 days. The ground is bad; the ground water is just below the cellar floor and the soil is a quicksand of extreme instability. There are tall buildings on two sides of the lot, the wall footings of which go down to water line. The caissons were sunk to 44 ft. below cellar bottom.

Seven of the caissons are 8½ ft. in diam., 15 of them 7 ft. 2 in. and 20 6 ft. 8 in. They are all 32 ft. high and the staves of which they are made are 4 in. x 10 in. yellow pine. Inside the cylindrical caissons are angle iron stiffeners of 3 in. x 3 in. x ⅜ in. steel. One of the peculiarities of these caissons is in the cutting edge, which is of



Electric Motors to Work Interlocked Derailing Switch—Taylor System.

28 in. x ⅜ in. steel plate, the plane in which the cutting edge lies being inclined to the vertical axis of the caisson. When the caisson stands upright the higher side of the cutting edge is 14 in. above the lower side. This scheme is patented by Mr. O'Rourke. The object of it will probably be apparent to the reader at once, namely, to provide a way by which the compressed air shall escape from the caisson. By turning the high side of the cutting edge from the buildings alongside the excavation the ground underlying the foundations of these buildings is not loosened by escaping air, as of course the air will go out at the highest side. No doubt this ingenious device has had much to do with the fact that the buildings adjoining this work have shown absolutely no disturbance.

One of these caissons weighs about 8½ tons and they were handled on the work by three derricks. Those who remember the description which we have published of these caissons and air locks will recall the fact that the air shaft ends in a dome covering the working chamber. This dome provides a convenient place for weighting the caisson and additional weight can be put on by arranging a platform at any one of the angle stiffeners inside the caisson which have been mentioned above. In the par-

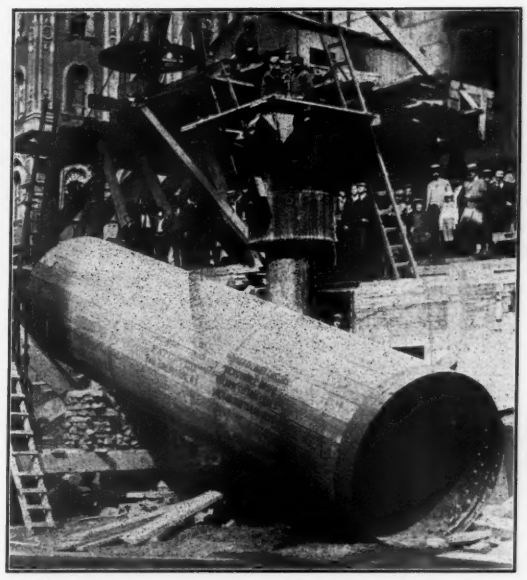
ticular work now under consideration the air pressure started at 2 lbs., which was reduced to 1½ lbs. if that was found sufficient, and then the pressure was increased by half pounds on signal. It varied greatly with the different caissons, one of which was carried to bed rock with a maximum pressure of eight pounds, while others required 17 lbs. to go the same depth. These were sunk to 44 ft. below the bottom of the general excavation.

The work was done by gangs of three or four men, according to the size of the caisson, and the excavation from inside the caissons amounted to about 2,500 yds. The material was taken out in half-yard cylindrical steel buckets, one of which was hoisted every three minutes when the work was going well. Each bucket remained from three to six seconds in an air lock. The caissons were kept thoroughly greased outside and were loaded up to 100 tons with pig iron.

One of the adjoining buildings was less than 3 in. from the nearest caisson and neither of these buildings was underpinned in the work. One of them is about 100 ft. high. The wall of another one, nine stories high, rested on the outer edge of a concrete footing, the load being estimated at 20 tons per lineal foot. This wall was shored to provide for any tendency to turn due to the eccentric load on the footing. In some cases the air was discovered to escape through the loose soil adjacent to the footings of these buildings when a few feet of coarse, sharp sand was rammed in on that side of the caisson.

The caissons were sunk through quicksand at an average rate of 2½ ft. an hour. One of them was sunk 24½ ft. in seven hours and all of them were sunk and finished in 36 days after the old building had been taken down to curb level.

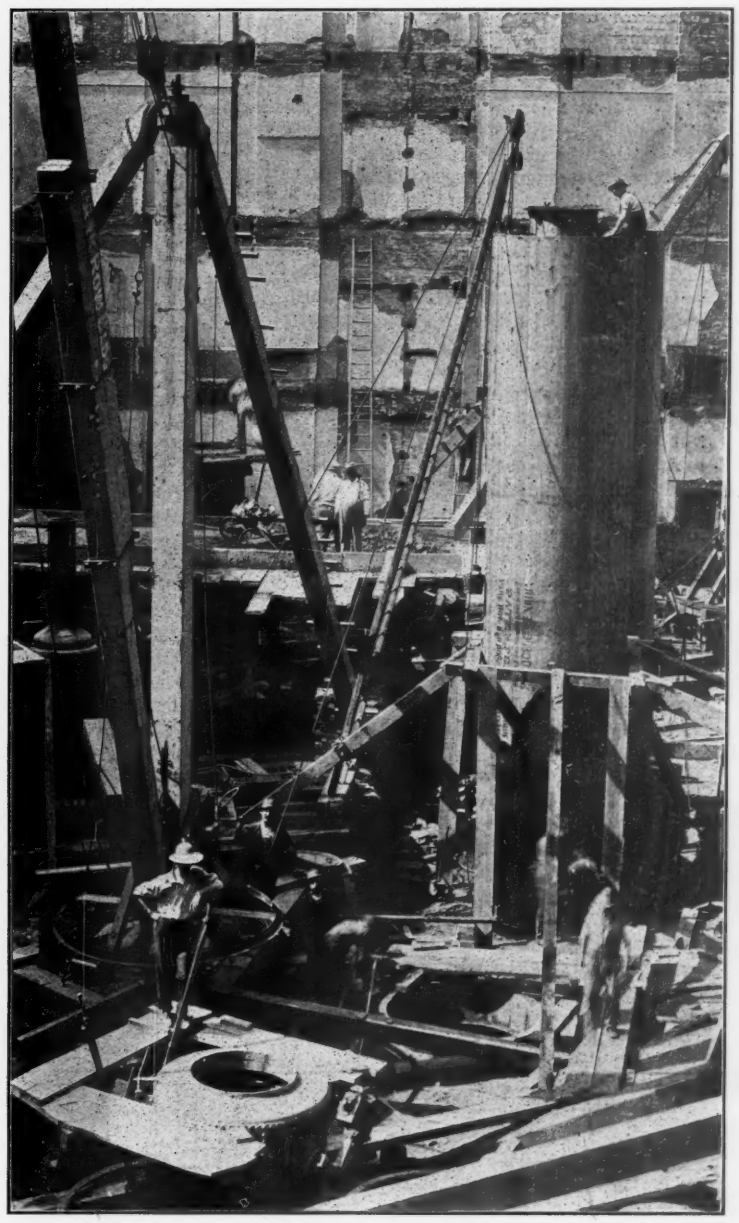
Quicksand mixed with gravel and boulders was found to a depth of about 45 ft. below the curb and under that hardpan and these were heightened by adding short lengths. When the excavation was completed to rock the working chamber was filled with concrete 1 to 2 to 4



Timber Caisson, Showing Cutting Edge.

and the air pressure was kept on for four or five hours, which caused the concrete to set faster than in the open air, and it was always hard when the pressure was released. Then the air lock, pig iron, air shaft and dome were removed and the caisson proper was filled with concrete 1 to 3 to 5, upon the concrete in the air chamber to the surface, thus making a monolithic pillar the entire height.

Air Lock and Top of Caisson—showing also section sometimes added.



Timber Caisson and Air Shaft ready to receive Air Lock—showing also tops of two caissons sunk.

O'Rourke's Timber Caissons for Pneumatic Foundations.

The Metropolitan Railroad of Vienna.

The first lines of the new Metropolitan Railroad of Vienna were put in operation in 1898 and the whole system was working July 1, 1899. Thirty-one kilometers of line was worked, and the passengers carried in 1899 amounted to 19,000,000, 92 per cent. of whom were strictly city passengers, the others, we suppose, having been delivered to the Metropolitan line by outside railroads. Of these 95.2 per cent. were third-class; 41.7 per cent. traveled in the first zone of three kilometers, 48.2 per cent. in the second zone from three to eight kilometers, and 10.1 per cent. in the third zone, or beyond 8 kilometers. The average daily service shows a fluctuation quite different from anything that we have in the United States; that is, in the 297 working days of the year only 65 per cent. of the travel was done, the average daily journeys having been 41,840. In the 68 Sundays and holidays 35 per cent. of all the work was done, the average daily journeys having been 97,347. The fluctuation of travel, even on these holidays, is very great, ranging from 70,000 a day up to 200,000. The maximum was on the third of July, 1899, 207,000 persons. In the year 1900 the maximum was 263,000 persons, on Pentecost Day. The total receipt for the year's working amounted to 135,800 francs per kilometer of line, while the expenses were 156,000 francs per kilometer; that is, on 31 kilometers in 1899 there was a deficit of almost 650,000 francs, exceeding by 362,000 francs the estimated deficit.

The Soo Canal Traffic for July.

The official compilation of traffic through the United States and Canadian canals at Sault Ste. Marie for the month of July shows the total tons of freight westbound 857,407, eastbound 3,244,358. Of this the traffic through the Canadian Canal was 7¼ per cent. Naturally, the largest item of eastbound tonnage was wheat, namely, 4,719,673 bu. A little more than one-third of this passed through the Canadian Canal. The next item in magnitude was iron ore, 2,783,555 tons, of which 5 per cent. was carried by the Canadian Canal. Grain other than wheat was 776,000 bu., and flour 705,000 bbls. The Canadian Canal carried about one-fourth of this grain and 10 per cent. of the flour. The great item of westbound traffic was coal, being 777,000 net tons. The number of vessel passages was 3,098 and the registered tonnage 3,513,000 net tons.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The compilation by *The Chronicle* of railroad gross earnings for July comprises 105 roads, with 98,386 miles. The total gross earnings were $51,433,416, a gain of $2,847,040, or 5.86 per cent. over the earnings of the same roads for the corresponding period a year ago. This improvement is small in comparison with the figures of preceding months, but a gain is made in spite of a falling off in grain, live stock and cotton traffic, and this gain is compared with the very heavy increase of a year ago, which reached $7,500,000, or over 17 per cent. There are 28 roads this year that report gains of over $30,000 for the month. Among these the Missouri Pacific leads with $287,807. Then follow the Denver & Rio Grande, $246,100; the Northern Pacific, $243,139; the Buffalo, Rochester & Pittsburgh, $195,165, and the Southern, $192,310. The gains of the Denver & Rio Grande follow a loss last year of $12,819 from the ore smelters' strike, and those of the Buffalo, Rochester & Pittsburgh follow a loss last year of $67,572, due to the strike of the coal miners. Five roads report decreases of over $30,000—the Chicago, Milwaukee & St. Paul, $164,151; the Mexican Central, $52,377; the Burlington, Cedar Rapids & Northern, $37,962; the Wisconsin Central, $34,679, and the Iowa Central, $32,614. Twenty-six roads of the entire 105 recorded report losses. The losses, it will be observed, are in the spring wheat territory, where the wheat crop has suffered heavily from the long-continued droughts of the spring. The grain receipts at Chicago for the month were 19,705,613 bushels in July this year, against 27,335,847 bushels a year ago. Grain movement at 10 centers for four weeks of July this year shows an aggregate delivery of 43,851,729 bushels of wheat, corn, barley, oats and rye, in comparison with 55,316,376 bushels for the corresponding weeks last year. The receipts of cotton at the principal outports in July this year were 97,969 bales, against 56,373 bales in 1899. But the shipments of cotton overland amounted to only 41,242 bales in July this year against 57,772 bales a year ago. In the figures of railroad earnings by groups the Northwestern and North Pacific group alone shows loss. The earnings for 12 roads this year were $13,042,648, against $13,187,125 a year ago, a loss of $144,477. But the decrease of $164,151 made by the Chicago, Milwaukee & St. Paul, one of the 12, exceeds that of the entire group.

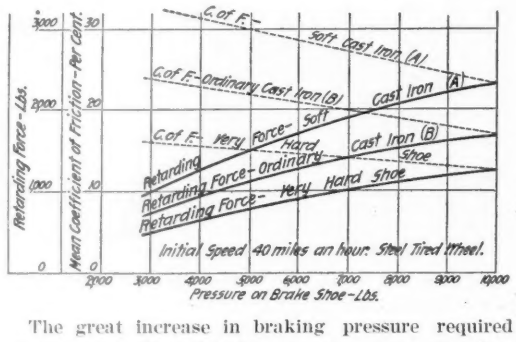
Brake Shoes.

As noted in our report of the M. C. B. Convention, June 22, the standing committee on brake shoes was instructed to present at the next meeting specifications for the frictional qualities of a suitable brake shoe. While it would be a difficult matter to make anything like complete specifications for brake shoes, yet definite recommendations can easily be made as to the proper limits of the co-efficient of friction. For instance, it is well known to those who have followed the work of the brake shoe committee, that the retardation given by ordinary cast iron shoes is very well suited to the present brake gear; in fact the brake rigging has been designed with reference to those brake shoes. Further, the M. C. B. tests of 1896 furnish exact data as to the friction of cast iron shoes, so that direct comparisons can now be made with new brake shoes as they are tested at Purdue. Information as to the desirable limits of the co-efficient of friction could possibly be put in better form for reference, but it is manifestly impracticable to frame satisfactory specifications under which brake shoes can be bought. The difficulty of making friction tests would alone preclude their being bought under such specifications, as steel and other materials are bought. The committee, however, has a fine chance to clear up some of the mistaken notions about the economy of extremely hard brake shoes.

Many roads are now using brake shoes which, as Mr. Bush said at the convention, "wear almost indefinitely," thinking that they are saving money. And the general impression that very hard brake shoes are economical is probably due to the misleading way in which comparative road tests are made. The common way of testing the wearing qualities of these brake shoes in service is to fit part of the wheels of a car with hard brake shoes, and the other wheels with plain cast iron shoes, or to fit different cars of a train with different kinds of shoes. As the retardation given by the hard shoes may be anywhere from 30 to 50 per cent. less than by plain cast iron, the result is that most of the braking is done by the softer shoes, causing them to wear out sooner than if all wheels were fitted with soft shoes. For the same reason, the hard shoes wear longer than they would if there were no soft shoes in the train, and these things hold whether the two kinds of brake shoes are used together on a car or whether some cars of a train have soft cast iron and other cars hard shoes. When we consider these facts, it is not surprising that we often hear of tests made in this way where a very hard brake shoe outwears from four to six plain cast iron shoes. Such tests are misleading, and the committee could do some useful work in showing by actual trials the fallacy of this method of testing. Probably it would be the most useful thing the committee could do at this time.

It will be conceded that, in comparative service tests to show wearing qualities, the conditions should be adjusted so that trains will be stopped in approximately the same time, whether hard or soft brake shoes are used; that is, so far as possible, comparisons should be made on a basis of equal braking power. If on account of inferior frictional qualities the hard shoes fail to make as short a stop as the softer ones, the braking pressure should be increased in the tests with hard shoes, or decreased in the soft brake shoe tests. So far as we know, service tests to show wearing qualities have never yet been made in this way, and in the absence of such tests it is not easy to predict just how the standing of the hard brake shoe would be affected, but the results would be surprising. It is certain that when deprived of the assistance of softer shoes, the hard ones would wear faster and the rate of wear would be still further increased if the braking pressure were raised so as to make a fair comparison with the work of the softer shoes. Further, the ratio of increase in braking pressure required to give equal retarding effects is raised still higher by the law that the co-efficient of friction decreases as the pressure is raised.

The difference in the retarding effect of soft and ordinary cast iron and the very hard shoes now coming into such general use is very well shown by the accompanying diagram. The dotted lines, giving approximately the mean co-efficients of friction of soft and ordinary cast iron brake shoes, are from the M. C. B. tests of 1896, and the lowest dotted line is from a similar test of very hard shoes. The tangential pull or retarding force for different braking pressures is shown in full lines.


C. of F.
Soft Cast Iron (A)
C. of F.-Ordinary Cast Iron (B)
Cast Iron (A)
C. of F.- Very Hard Cast Iron (B)
Retarding Force- Soft Shoe
Retarding Force- Ordinary Shoe
Retarding Force- Very Hard Shoe
Initial Speed 40 miles an hour. Steel Tired Wheel.
Retarding force - Lbs.
Mean Coefficient of Friction - Per Cent.
Pressure on Brake Shoe - Lbs.

The great increase in braking pressure required with very hard brake shoes to give equal retarding effects is made apparent by noting where horizontal lines cut the several retardation curves. Thus a pressure on the soft shoe of 4,000 lbs. is equivalent in effect to a braking pressure of about 6,000 lbs. with the ordinary cast iron shoe and 10,000 lbs. with very hard shoes. On the other hand with equal braking pressures, and other things being equal, the ratio of the retarding effects indicates the relative length of stops. With a brake shoe pressure of 10,000 lbs., the soft cast iron shoes should stop a train in about one-half and the ordinary cast iron shoes in about three-fourths the distance required with the hard shoes. These figures show how misleading it is to make comparative service tests for wear with two widely different kinds of brake shoes on the same train unless the pressures are so regulated that each shoe does its full share of the work, and as said before a failure to take account of these things has gone a long way toward making the remarkable records for long life of the hard brake shoes. On a basis of equal retardation, different results may well be expected from a test of wearing qualities of soft and hard brake shoes, and in the end the softer brake shoes will doubtless be found the more economical.

Roads using extremely hard brake shoes have been obliged to increase the braking pressure, and when this is done the brake rigging throughout is severely strained, besides which the shoes are broken long before they are worn out. If the braking pressure is not increased with the hard shoes, considerably longer stops result; something which should meet with disapproval in view of the high speeds of passenger and freight trains. It is thought the brake shoe committee can do some useful work by making rational comparative tests of the wearing qualities of hard and soft cast iron brake shoes.

June Accidents.

Our record of train accidents in June, given in this number, includes 84 collisions, 119 derailments and 9 other accidents, a total of 212 accidents, in which 80 persons were killed and 189 injured. The detailed list, printed on another page contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

Collisions:	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	5	0	0	5
Misplaced switch	4	1	4	9
Failure to give or observe signal	3	0	2	5
Mistake in giving or understanding orders	0	3	0	3
Miscellaneous	6	2	5	13
Unexplained	14	11	24	49
Totals	32	17	35	84

Derailments.

Broken rail	1	Misplaced switch	6
Loose or spread rail	2	Derailing switch	1
Defective bridge	3	Careless running	1
Defective switch	3	Bad switching	2
Distorted track	1	Too quick application of air-brakes	2
Broken wheel	10	Runaway	2
Broken axle	9	Failure in signaling	1
Broken truck	4	Open draw	1
Brake hose burst	1	Landslide	1
Failure of drawbar	1	Washout	4
Failure of drawbar and automatic application of air-brakes	1	Malicious obstruction	2
Loose wheel	1	Accidental obstruction	2
Broken car	1	Cyclone	1
Loose pilot	1	Unexplained	53
Loose tire	1	Total	119

Other Accidents.

Broken side rod	2
Cars burned while running	4
Various breakages of rolling stock	1
Other causes	2— 9
Total number of accidents	212

A general classification shows:

	Collisions.	Derailments.	Other accidents.	Total.	P. C.
Defects of road	0	10	0	10	4
Defects of equipment	5	30	3	38	18
Negligence in operating	30	16	4	50	23
Unforeseen obstructions	0	10	2	12	5
Unexplained	49	53	0	102	50
Totals	84	119	9	212	100

The casualties may be divided as follows:

Killed:	Collisions.	Derailments.	Other accidents.	Total.
Employees	22	28	0	50
Passengers	5	18	0	23
Others	3	4	0	7
Totals	30	50	0	80
Injured:				
Employees	46	44	2	92
Passengers	48	40	5	93
Others	0	4	0	4
Totals	94	88	7	189

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	1	24	2	6
Defects of equipment	0	0	2	15
Negligence in operating	5	48	22	50
Unforeseen obstructions and maliciousness	17	18	21	14
Unexplained	0	3	3	7
Totals	23	93	50	92

Thirty accidents caused the death of one or more persons each, and 35 caused injury but not death, leaving 147 (69 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with June of the previous five years shows:

	1900.	1899.	1898.	1897.	1896.	1895.
Collisions	84	100	52	40	40	40
Derailments	119	115	88	52	49	55
Other accidents	9	5	6	3	5	4
Total accidents	212	220	146	95	94	99
Employees killed	50	15	21	32	14	22
Others killed	30	4	7	13	16	13
Employees injured	92	73	67	47	37	51
Others injured	97	102	64	80	19	32
Average per day:						
Accidents	7.07	7.33	4.87	3.17	3.13	3.30
Killed	2.66	6.33	0.93	1.50	1.00	1.17
Injured	6.30	5.83	4.37	4.23	1.53	2.77
Average per accident:						
Killed	0.38	0.08	0.19	0.47	0.32	0.35
Injured	0.89	0.79	0.90	1.33	0.60	0.83

The most disastrous wreck in June was that at McDonough, Ga., on the 23d, killing at least 32 persons. Such sudden and complete extinction of human life on every one of four vehicles in a train (the engine, baggage car, second-class passenger and third-class passenger—the whole train except the sleeping car) it has not before been our lot to record since the disaster at the Tay Bridge in 1879. The possible causes of a wreck like this one are numerous and complicated; the questions of responsibility and of the means of prevention are correspondingly difficult. The accounts seem to indicate that the inspection of the road by the trackmen was reasonably vigilant, and intelligent. But even the most efficient inspection may, at night, fail to discover weak spots in a bank several yards below the track; so that of the various elements in the risk incident to running trains after dark that of a washout must be classed as the hardest to guard against. Questions concerning the manner of original construction are as difficult as those of inspection. In the attempt to provide against washouts, a complicated problem at once arises in deciding how far one's money can be made to go. How complete is it practicable to make the provision against floods in building a railroad? How large can the waterways be made? In the present case the culvert had stood a dozen years. To provide for the outflow of the greatest quantity of water likely ever to fall on a given watershed would in many cases require culverts twice as large as would be necessary for what engineers estimate to be the probable requirement. Should money be spent in providing for very remote contingencies? Or should it, rather, go for safety devices in some other department, where the need can be more clearly apprehended? No one can answer this question in a general way; it can be considered only in the concrete; and it is quite possible to pay for insurance against disaster at rates which are unjustifiably high.

The second most serious passenger train accident in June was the collision at De Pere, Wis., on the 20th. The other case which was fatal to passengers, was the derailment at Persia, Iowa, on the 7th. Near Oswego, Kan., on the 7th, a train was ditched by a cyclone. Near West Falls, N. Y., on the 15th, there was a passenger train collision due to the negligence of a telegraph operator. He appears to have written the name of the wrong station in an order as he received it and to have discovered his error before repeating the message; but he did not correct the written word; and then, after transmitting to the dispatcher the right name he delivered the order with the wrong name still standing. Other passenger train accidents prominent in the record are those at Summit, Mont., on the 12th; Birmingham, Pa., on the 16th; and Calvary, Ky., on the 19th.

On a logging road near Cammal, Pa., on the 13th, six men were killed by the wrecking of a train which became uncontrollable on a steep grade. The train consisted of two cars and a cog-wheel locomotive.

Near Grand Falls, N. B., on the 21st, a mixed train fell through a high bridge and the whole train, except the two rear cars, lodged in the water about 50 ft. below. There were only 7 passengers on the train, three of whom were injured. The cause of the derailment is obscure.

We have reports of 11 electric car accidents, in June, in which eight persons were killed and 78 injured. Three of these accidents were runaways on steep grades, in one of which 22 persons were injured. One of the runaways is attributed to the failure of a brake chain. The most serious accident in this list was a butting collision near Warwick, R. I., in which 4 persons were killed and 26 injured. It is said that this collision was the result of an attempt on the part of one of the motormen to "steal a switch." In consequence of heavy traffic the cars were not running on time and the motorman was endeavoring to improve matters by making meeting points for himself.

Compound Locomotive Performance.

Mr. D. Van Alstine, Master Mechanic of the Chicago Great Western, has been keeping a careful record of the performance of their simple and compound freight locomotives, most of which were put in service on that road about a year ago, and the average performance for eleven months is given in the accompanying table. The ten-wheel Baldwin locomotives are identical excepting the cylinder arrangement, and the same can be said of the simple and compound mogul engines built by the Richmond Locomotive & Machine Works.

The Baldwin four-cylinder compounds show a saving of 20 per cent. of fuel and the Richmond compound a 10 per cent. fuel saving when compared with simple engines of the same class. When comparison is made with the older 18 x 24-in. mogul engines, which are not so large and carry lower steam pressures, the Baldwin ten-wheel compounds show a saving of 25 per cent. of fuel on the ton-mile basis; the new simple ten-wheel engines 6 per cent.; the Richmond mogul compound 33 per cent. and the new mogul simple engine a saving of 25 per cent. of coal.

The cost of repairs is shown on the basis of engine-miles and it will be seen that the four-cylinder and simple ten-wheel engines cost practically the same for repairs, which is about 25 per cent. less than the old 18 x 24-in. moguls; the new simple mogul engine cost about the same for repairs as the smaller mogul engines, while the two-cylinder compound cost almost twice as much for repairs as the simple engines of the same type.

SIMPLE AND COMPOUND FREIGHT LOCOMOTIVES, MAY, 1899, TO MARCH, 1900, INCLUSIVE. CHICAGO GREAT WESTERN RY.

Description of engine.	Builder.	No. in serv-ice.	Weight on drivers, lbs.	Diam. of drivers, in.	Size of cylinders, in. x in.	Heating surface, sq. ft.	Grate area, sq. ft.	Boiler pressure, lbs.	Cost of repairs. Cents per engine mile.	Coal consumption. Tons per 10,000 ton-miles. (Excl. engine and caboose.)	Per cent. of 18-in. moguls =100 p.c.
10-wheel, simple	Baldwin	5	117,800	63	20x28	2,600	32.5	200	3.60	1.08	94
10-wheel, 4-cyl. comp'd.	Baldwin	5	120,250	63	15½ and 26x28	2,600	32.5	200	3.63	.86	75
*10-wheel, 2-cyl. comp'd.	Rhode Island.	10	119,320	63	22 and 35x28	2,600	32.5	200	....	.92	80
Mogul, simple	Cooke & R. L.	49	88,000	55	18x24	1,200	18.2	160	4.84	1.15	100
Mogul, simple	Richmond	1	100,950	60	19x28	1,838	28.0	180	5.0	.86	75
Mogul, 2-cyl. compound	Richmond	1	101,600	60	21 and 33x28	1,838	28.0	180	9.5	.77	67

*Record for March, 1900, only.

As stated, the table shows the average performance for eleven months, excepting the two-cylinder compounds built by the Rhode Island Locomotive Works for which only the performance in March last is given; these have only been in service since the first of that month. This statement does not show the oil costs, but it is found on the Chicago Great Western that it costs somewhat more to lubricate compound than simple engines.

Block Signaling on the Continent.

The status of automatic block signaling in other countries than the United States forms the subject of a report to the International Railroad Congress, by Mr. Cossmann, Chief Engineer of the Technical Department of the Northern Railroad of France, and it is printed in the July number of the *Bulletin*, Vol. XIV, No. 7. On the specific subject named in the title, this report is exceedingly brief, for out of 91 railroads inquired of only 52 replied, and of these 52, only five have made trials of automatic block apparatus. It appears that none whatever have used it in regular service without attendants. The paper is of interest, however, as throwing some light on the present attitude of railroad engineers in Europe toward automatic block signaling, and also as giving some facts concerning their practice in non-automatic block signaling and other cognate matters.

It appears that the use of track instruments (or of short rail circuits) for automatically setting a signal in the stop position after a train passes is very general, especially in France. The only automatic block system of any extent mentioned in the report is an installation of the Hall system on 25 miles of the Paris, Lyons & Mediterranean, from Laroche to Cravant, France; but even this is described as being on trial, the officers being so very conservative that they still maintain man-operated block signals on this part of the line. (This report is not dated; it may be several months old.) It appears that in this installation the Hall Company, in order to conform to French standards, has used a disk, turning on a vertical axis and moved by an electric motor.

Mr. Cossmann says that it will be the duty of the P. L. M. to give the World's Railroad Congress "full information" in regard to the results obtained with these automatic signals. It is perhaps presumptuous for us to observe that "full information" which would answer all the doubts of Mr. Cossmann and his confreres could have been obtained in America at any time during the past five years; but we may at least suggest that, when he gets the full information desired, he will be warranted in acting on it at once.

The appendix to this paper gives a full description of the Hall signal connections, and also of some of the other apparatus mentioned in the article. It also gives, in the replies from certain railroads, the length of line worked under the non-automatic block system. These items make an aggregate of 1,451 miles, as follows:

	Miles.
Austrian Kaiser Ferdinand	32
Austrian Southern	27
Belgian State	738
French State	41
Western of France	237
Italian Meridional	7
Italian Mediterranean	87
Dutch Railroads	158
Riazan-Ural	124

The Western of France reports that automatic block signals have been tried and have proved satisfactory; and that the company is now going to apply the system to regular work; but at the same time other expressions in the railroad company's report indicate that perhaps, after all, the intention is simply to use a continuous rail circuit for controlling lock-and-block manual apparatus by the movements of trains. It will be observed that no information is given concerning German railroads.

The use of telephones for the transmission of written train orders does not seem to spread very fast; but for block signaling these instruments are now used at a good many stations. The Erie has used them for some time. The Atchison uses them at places where the telegraph was never installed. Indeed, the introduction of block signaling on a line in such a thinly settled territory as Oklahoma is doubtless made somewhat easier when a part of the offices can be run without a trained telegrapher, as it is difficult, at best, to get desirable persons to go to desolate stations remote from civilization. The last road that we have heard of as introducing the telephone is the Baltimore & Ohio, which is using it on a short line near Philadelphia. On this line some of the offices are, we believe, manned by trainmen who have been incapacitated by accident for active outdoor duty. It seems to us that this feature of the matter is worthy of attention. Possibly in quickness to learn new duties a disabled fireman or brakeman would be less efficient as a signalman than a young man or woman of no railroad experience but with more or better school training. On the other hand, a man who has worked a year on or about trains has acquired experience which is of great value in a station office of any kind; in signaling, handling train orders, or anything else. A bright young person just out of school has a certain advantage over a brakeman, and can learn rapidly; but he usually has little railroad knowledge. A brakeman may have the minimum of the three R's (he must, of course, have at least a respectable minimum of these), but he has the railroad knowledge, and, if partly disabled, has a motive for staying in his place that is not found in the ambitious young scholar capable of doing many other kinds of work. And, perhaps, the most valuable of all of the brakeman's qualifications is that he is older. With a force of 10 or a hundred such signalmen the average age would, no doubt, be found considerably higher than the average of all operators. This is important, for one of the weakest elements of the personnel in this department of railroading is the tendency of employing officers to engage young persons because they are bright minded and do not command high wages. Nothing is clearer in a study of train-accident records than that the youthfulness of telegraph or signal men is a contributing cause in a constant percentage of cases. Efficiency in these positions depends largely on that kind of training which the men get from contact with the world in general, as distinguished from special or technical training.

TRADE CATALOGUES.

The Brown & Sharpe Mfg. Co., Providence, R. I., sends a pamphlet designed chiefly as a souvenir for those who visit the exhibit of that company at the Paris World's Fair. This pamphlet contains a brief history of the growth of the business and something of the story of the development of the machines and tools made by Brown & Sharpe, and it is quite worth reading. Some of our readers will be especially interested in the remarks about the apprentices. The company has a large and well-organized apprentice system. These apprentices are organized into an association, and hold meetings from time to time during working hours. These meetings are addressed by competent men or the time is occupied by debates on subjects connected with the work. The apprentices are in charge of one man, who carefully superintends their work, makes suggestions as to the work itself and as to studies and recreations outside of working hours. He also looks after them somewhat in their homes. The men have a mutual relief association, which they manage themselves, and the company provides a library of technical and reference books and also books of general literature.

The Bignall & Keeler Mfg. Co., Edwardsville, Ill., is sending out a pamphlet descriptive of its line of Peerless combination bench and pipe vises. It makes two patterns of these vises; No. 1 for ⅛ to 2 in. pipe, and No. 2 for ⅛ to 3 in. pipe, having a swivel base on which the vise may be rotated to line the jaws up with length of bench or at any angle thereto. The No. 3 for ⅛ to 4 in. pipe, and No. 4 for ⅛ to 6 in. pipe have fixed base which is immovably secured to the bench. Attention is called to the fact that the pipe jaws are held in place by screws, not riveted pins, and therefore may be quickly removed and the vise used for ordinary bench work to the full depth of the throat. Incidentally mention is made of the Peerless and Duplex pipe threading and cutting machines which the company has been making for 20 years.

Motor Trucks.—The McGuire Mfg. Co., 122 Sangamon street, Chicago, also in New York and San Francisco, sends us a handsome pamphlet showing its various styles of motor truck. The engravings are from photo-

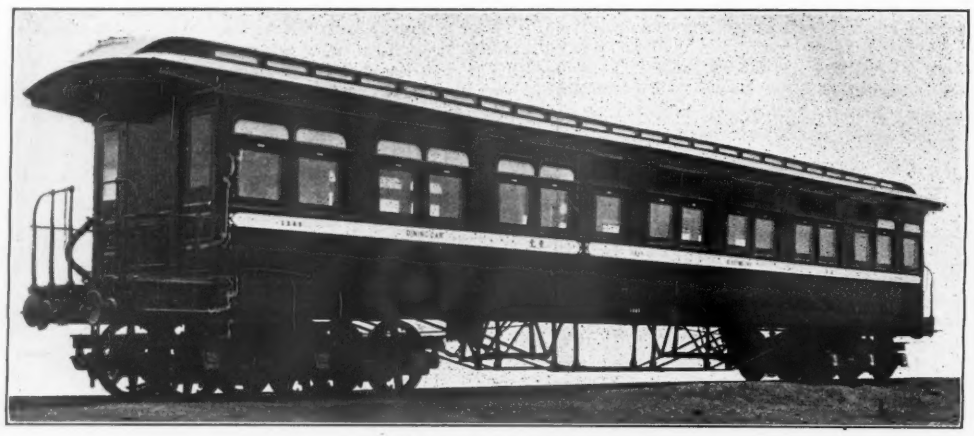
graphs, large and well executed. Each one is accompanied by a very short description and some note of its use in actual service. The same pamphlet shows a snow plow and sweeper, sprinkler, car stove and other special devices.

Pipe Threading Machines.—The Bignall & Keeler Mfg. Co., of Edwardsville, Ill., issues a circular describing a pipe threading machine designed for use in car shops and supply houses where large quantities of pipe of one size are threaded. It threads and cuts pipe and nipples from ¼ in. to 2 in. and has an automatic quick-acting dripping device which makes it very rapid in work. These machines are in use in the car shops of many railroads.

Asbestos.—The H. W. Johns Mfg. Co., 100 William street, send us a pamphlet of 62 pages describing their asbestos wares. The pamphlet is excellently printed and has a good alphabetical index. The engravings show asbestos applied to a great variety of uses. The pamphlet is issued in an asbestos cover.

Japan's First Sleeping and Dining Car.

The first class combined dining and sleeping car shown by the engravings is one of three built in five months, at the Kobe shops of the Sanyo (3 ft. 6 in. gage) Railroad, of Japan, under the supervision of Mr. Iwasaki, Locomotive Superintendent of the road, and is the first car of its kind and the first sleeping car in Japan. It has been running since April 8, in night service, between Osaka and Mitajiri, 300 miles, 279 of which is the Sanyo Railroad and 21 miles an Imperial Government line. An extra charge of 2 yen ($1) is made for the use of a berth. In the dining section, meals are served both à la carte and table d'hote.



A Sleeping and Dining Car Built in Japan.

The car measures about 58 ft. long over buffers, 9 ft. wide, over all, and 12 ft. high from rail to top of car. The sleeping compartment occupies nearly two-thirds the length of the car, and is fitted with two lavatories and eight lower and upper berths, each measuring about 6 ft. 6 in. long and 3 ft. wide. The upper berths are ventilated, as may be seen from the exterior view. The dining section has a kitchen and four tables, accommodating 8 persons at one time. As will be seen by the exterior view, the car has two six-wheel trucks, which is interesting because it is the first car in Japan to be fitted with more than eight wheels.

The car is equipped with vacuum brakes, is heated by steam and lighted by electricity from a dynamo, worked by a gas engine, placed in the baggage car of the train. Mr. K. Nishino, Traffic Manager of the Sanyo Railroad, to whom we are indebted for this information, tells us that the car has become very popular, all the berths having been sold every night since the car was first run.

Interior of a Japanese Sleeping Car.

Evolution of the Southern Railway.

Six years ago the company now represented by the Southern Railway was in the hands of the courts, a bankrupt road. To-day it is one of the strong railroads of the country. Then its receiver operated barely 2,000 miles of railroad. There were also about 2,400 miles of other lines separately controlled by the courts and formerly part of the system. To-day the company operates 6,415 miles and has closely affiliated with it 3,650 miles more, or a total of 10,065 miles. The funded debt of the lines actually operated (owned, leased or controlled) aggregates $122,000,000 and their capital stock $197,000,000, a total of $319,000,000.

The Southern Railway is successor to the old Richmond & Danville, which was chartered March 9, 1847. The main line, from Richmond to Danville, 140 miles, was opened May 16, 1856. Roads were added by purchase and building until in 1880 the company owned, leased and controlled 2,075 miles of railroad. Its charter at that time debarred it from owning stock in any but connecting lines. The Richmond & West Point Terminal & Warehouse Company was therefore organized in 1880 to acquire roads in the interest of the parent company. By 1892 the mileage owned and controlled by the Terminal Company aggregated 8,553, besides 500 miles of water lines. The parent company then owned nearly $78,000,000 in the stocks and bonds of controlled companies. Its common stock was seventy millions and its preferred five millions. Five per cent. dividends had been paid on the preferred since 1887.

Early in 1891 the Terminal Company entered into negotiations with the view to unifying the system. But the terms were not satisfactory to some of the companies. Floating debts aggregating about $10,000,000 for needed equipment and improvements were contracted by the Richmond & Danville, the East Tennessee, Virginia & Georgia and the Central Railroad & Banking Company of Georgia. The Terminal Company was unable to meet these and a committee was appointed in December, 1891, to prepare a plan of reorganization. But the plan formulated was rejected, and before a new one could be prepared the properties were in the hands of the courts. A receiver was appointed for the Central Railroad & Banking Company of Georgia, March 4, 1892, and for the Richmond & Danville, June 16, following. On June 22 the receivership was extended over the Terminal Company and later receivers were appointed for other of the properties.

Out of this situation the new company was born two years later. The Southern Railway was chartered February 20, 1894, and was organized June 18 following. The property of the Richmond & Danville, comprising 2,012 miles of road, was turned over July 1. A month later control was taken of the East Tennessee, Virginia & Georgia, 1,265 miles, the Columbia & Greenville, 229 miles and the Charlotte, Columbia and Augusta, 191 miles. On Sept. 1 the company took possession of the Georgia Pacific, 556 miles, and the Louisville Southern, 130 miles. The railroad then owned or controlled and operated was 4,392 miles. On June 22, 1895, there was added the Atlanta & Florida, 102 miles; in 1896 the Georgia Midland, 98 miles, and the Strasburg-Harrisonburg branch of the Virginia Midland, 50 miles; in 1898 the Memphis Division, 332 miles, and the Knoxville, Cumberland Gap & Louisville, 73 miles; and in 1899 the Mobile & Birmingham, 149 miles, the Atlantic & Yadkin, 166 miles; the South Carolina & Georgia, 323 miles; the Atlantic & Danville, 276 miles, and the North-Eastern R. R. of Georgia, 39 miles.

When the Florida Central & Peninsular was taken over by the Syndicate that is amalgamating the Greater Seaboard Air Line System, the Southern lost its direct connection with Savannah from Columbia. The Southern thereupon bought the Carolina Midland and the Seivern & Knoxville, which extend from Batesburg, S. C., south 71.58 miles to Allendale. Recently a cut-off of about 30 miles was completed from Columbia south to Perry, a few miles below Batesburg, which gives the company a direct route to Allendale. Thence trackage rights have been acquired over the Atlantic Coast Line to Yemassee, and over the Plant System into Savannah.

With other additions from new roads built, trackage rights acquired, etc., the company now operates 6,415 miles of railroad, which gives it rank among the great systems of the country. The growth of the system is summarized in the table below, which shows the mileage operated on July 1 of each year since the new company took possession, also the gross earnings and their average per mile operated on the basis of the average mileage of the year.

Mileage and Earnings of the Southern.

	Mileage, July 1.	Gross earnings for year ended June 30. Total.	Per mile operated.*
1894	2,012.29	.....	.....
1895	4,391.94	$17,114,792	$4,135
1896	4,654.33	19,082,247	4,172
1897	4,827.22	19,079,500	3,970
1898	5,231.67	21,095,838	4,276
1899	5,958.68	25,353,686	4,764
1900	6,415.54	31,200,870	4,948

*Average mileage operated during the year.

The roads so far considered are only those actually operated by the Southern and do not include a number of lines more or less intimately associated with the system. In 1899 the Southern bought a large majority of the bonds and stock of the Northern Alabama, comprising, with branches, 118 miles. This property is still operated separately. On the following June it acquired from the Tennessee Coal, Iron & Railroad Company one-half of the stock of the Birmingham Southern. The other half is owned by the Louisville & Nashville and the property is operated under a joint agreement. The Southern also owns an equal share with seven other companies in the stock of the Norfolk & Portsmouth Belt Line which gives it terminals in those cities. Recently interests identified with the Southern have acquired control of the Louisville, Evansville & St. Louis Consolidated, which it is proposed to absorb after reorganization. This will add about 374 miles to the Southern and give it a connecting line to St. Louis over its own tracks.

The Cincinnati, New Orleans & Texas Pacific is the lessee of the Cincinnati Southern, which is owned by the city of Cincinnati. The stock of the operating company is owned jointly by the Southern and the Cincinnati, Hamilton & Dayton. The Southern also owns a majority of the capital stock of the Alabama Great Southern. These two roads, comprising 672 miles, are operated separately as part of the Queen & Crescent Route. The other three roads of the Queen & Crescent are the New Orleans & Northeastern, 196 miles; the Vicksburg, Shreveport & Pacific, 189 miles, and the Alabama & Vicksburg, 143 miles, a total of 528 miles. They are controlled by the Alabama, New Orleans, Texas & Pacific Junction Railway Company, an English corporation formed in 1881 to control such lines as could be advantageously associated with the Alabama Great Southern. Through the ownership by the Southern of the Alabama Great Southern and the Cincinnati, New Orleans & Texas Pacific, the entire 1,200 miles of the Queen & Crescent is thus brought into close affiliation with that company.

The Georgia Southern & Florida, since its reorganiza-

tion, in 1895, has been closely affiliated with the Southern, whose President is also the President of that company. It comprises 285 miles of road. The Central of Georgia is successor to the Central Railroad & Banking Company of Georgia, which, prior to the receivership, first dividend—1 per cent.—was declared in January, 1897, the only one for that year. One per cent. was paid in 1898 and 2 per cent. in 1899. In April last a dividend of 1½ per cent. was declared, placing the stock on a 3 per cent. basis. Earnings continue to show improvement. For the 12 months to June 30, 1900, the gross earnings were $31,200,870, and the net earnings, $9,369,423. This is a gain of $5,847,184 in gross and of $1,372,092 in net earnings. After deducting interest, rentals, etc., the balance applicable to dividends is $2,917,252. This is 4.86 per cent. on the preferred stock, which is entitled to 5 per cent. It is not surprising, therefore, that the preferred stock has been selling on the Stock Exchange recently in the negihborhood of 60.

SOUTHERN RAILWAY AND AFFILIATED LINES.

	Mileage.	Capital stock.	Funded debt.	Gross earnings. d
Southern Ry. proper:				
Owned lines	3,618.36	$180,000,000	a$100,432,300	.....
Leased lines	1,420.78	16,309,600	16,153,000	.....
Operated under contract	248.67	69,900	.....	.....
Controlled	777.44	1,029,000	5,148,000	.....
Trackage	350.29	.....	.....	.....
Total	6,415.54	$197,408,500	$121,733,300	$27,696,180
Affiliated lines:				
Northern Alabama	119.3	$2,000,000	$1,650,000	$233,828
Georgia Southern & Florida	285.	2,768,000	3,666,000	953,798
Alabama Great Southern	334.03	11,210,350	4,976,380	1,816,523
Cincinnati, New Orleans & Texas Pacific	338.26	3,000,000	b18,610,000	4,691,232
Other Queen & Crescent c	527.71	7,301,500	16,312,710	2,921,608
Central of Georgia	1,595.72	11,484,005	46,101,000	5,767,346
Louisville, Evansville & St. Louis	374.01	4,307,909	11,720,350	e1,806,752
Birmingham Southern	70.	1,200,000	.....	f ?
Norfolk & Portsmouth Belt	5.8	49,600	250,000	f ?
Total	3,649.83	$43,321,364	$103,286,440	$18,191,087
Aggregate	10,065.37	$240,729,864	$225,019,740	$45,887,267

a. Does not include $2,000,000 Knoxville & Ohio bonds, $1,000,000 Spartanburg, Union & Columbia bonds, and $1,500,000 Atlantic & Yadkin bonds which are incorporated into the total of the controlled roads.
b. The funded debt is that of the Cincinnati Southern representing the cost of the roadbed.
c. Thees lines are controlled by the Alabama, New Orleans, Texas & Pacific Junction Company. They are the New Orleans & Northeastern, 195.9 miles; the Vicksburg, Shreveport & Pacific, 188.42 miles; the Alabama & Vicksburg, 143.39 miles.
d. Earnings are for the year ended June 30, 1899, except where otherwise indicated.
e. Earnings for the year ended Dec. 31, 1899.
f. Earnings not reported.

was leased to the Richmond & Danville. The road comprises 1,596 miles, and while operated independently of the Southern, its capital stock is controlled by interests friendly to that system. As already stated, the length of these affiliated roads aggregates 3,650 miles and, with the 6,415 miles operated by the Southern, brings the total of the group up to 10,065 miles. Their funded debt and capital stock aggregate $465,000,000 and their gross annual earnings last year reached nearly $46,000,000. The figures in some detail are shown in the table.

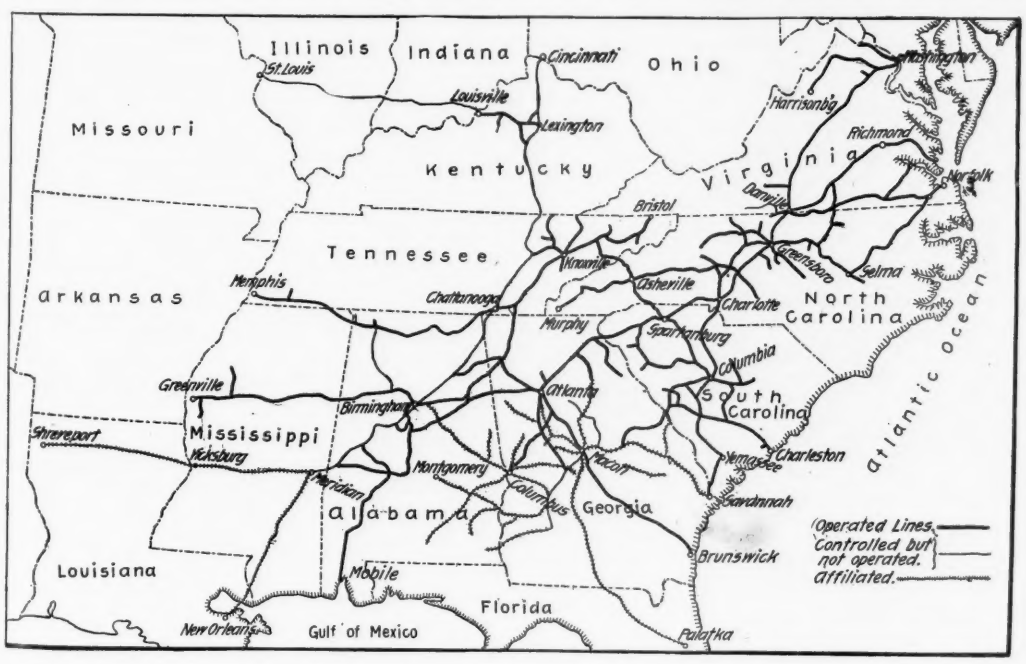
The 6,415 miles now operated by the Southern comprise roads in nine states of the South Atlantic, while its affiliated roads reach five states more. The system serves the vast area east of the Mississippi and south of the Ohio and Potomac. From its northeastern gateways at Washington, West Point and Norfolk, it spreads south and west to the Atlantic, the Gulf and the Mississippi. There is a wide diversity in its traffic. On the 5,254 miles of road operated during the entire fiscal year 1899 there were carried 10,220,000 tons of freight. Of this 15.65 per cent. was the products of agriculture; 2.42 per cent. the products of animals; 36.67 per cent. of mines; 12.5 per cent. of forests, and 29.76 per cent. manufactured and miscellaneous articles. The largest single product moved was bituminous coal aggregating 2,969,482 tons or 29 per cent. of the entire tonnage. Ores of all kinds, including pyrites, took up 4 per cent.; iron and steel and their products 6 1-3 per cent. Cotton and its manufactures supplied 9 per cent. of the tonnage. The total revenues from this freight were $15,901,845, or 63½ per cent. of all receipts. With the rapid development of iron industries in Alabama and Tennessee, and of cotton industries in all parts of the South, traffic in these industries will gain new prominence.

As already stated, the gross earnings of the company for the year ended June 30, 1899, were in excess of $25,000,000. The operated expenses were 17 1-3 millions, which is 68½ per cent. of the gross earnings. After deducting from the net income the interest and rentals and taking account of other minor incomes and expenditures, there was left on July 1, 1899, $2,094,519 to be applied to dividends, or within $5,500 of 3½ per cent. on the $60,000,000 preferred stock of the company. This stock is entitled to 5 per cent. non-cumulative dividends. The serves. The ten states south of the Ohio and Potomac and east of the Mississippi have approximately 35,000 miles of railroad. Of this 29 per cent. belongs to the Southern Railway and its allied lines. These states have 450,000 square miles of area, or one-seventh that of the United States, exclusive of the outlying possessions. In 1870 the population was 9,200,000. Twenty years later it was 13,850,000. To-day it is estimated at 16,000,000. Until lately the development of the South has been slow. Especially is this true in comparison with the West. Falling prices in cotton, sugar and other products of the soil have made advancement difficult. But new conditions have arisen through improved prices and the development of other industries. These states have become a factor to be reckoned with in the coal and iron markets of the world. In 1880 they produced 3¾ million tons of bituminous coal which was but 9 per cent. of the production of the United States. In 1898 they produced 28¾ million tons—a gain of sevenfold in 18 years. They are now mining approximately a fifth of the entire bituminous coal product of the nation.

In 1872 these states produced 150,000 gross tons of pig iron, or only 6 per cent. of the nation's total product. In 1890 the pig iron products had risen to 1,383,000 tons and last year to 2,120,000 gross tons. Of this latter, 1,083,000 tons, or more than one-half, came from Alabama, which in 1872 mined but 11,000 tons. Alabama's product had risen to 69,000 tons in 1880, and she was excelled by eight states. To-day only three states, Pennsylvania, Illinois and Ohio, outrank her.

These Southern states in 1870 produced 2,060,000 bales of cotton, or a fraction over two-thirds of the entire cotton crop of the nation. In 1898 these states raised but little over one-half the crop (52 per cent.), yet the total yield was 5,840,000 bales. This was in the year of 6-cent cotton. With the stimulus which 9 and 10-cent cotton will bring we presume that this crop will be largely extended this coming year.

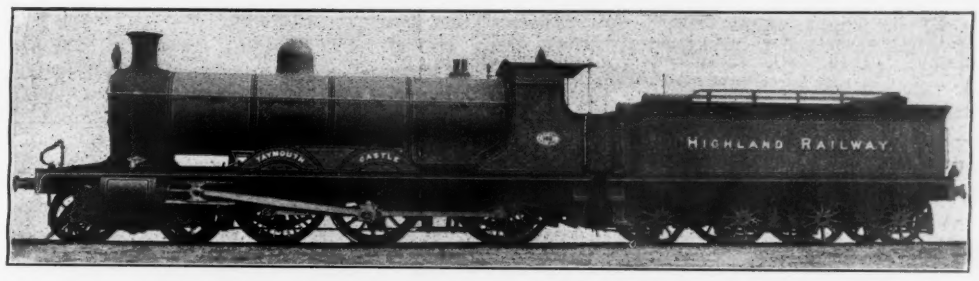
Under conditions such as these the Southern Railway is expanding in mileage, territory and business and so in wealth and importance. Just such expansion in the country west of the Mississippi has made the Chicago & Northwestern, the Burlington, the St. Paul and the Great Northern the commanding powers they are to-day. Men who have confidence in the future of the South and in the conservative but progressive management of the Southern Railway are looking in the no distant future for a like position for this great railroad property.



The Southern Railway System With Its Controlled and Affiliated Lines.

A New Class of 10-Wheel Express Engines for the Highland Railway.

The accompanying illustration shows a new class of 10-wheel express engines, several of which were recently built by Messrs. Dübs & Co., of Glasgow, for the Highland Railway of Scotland. These engines have cylinders



Ten-Wheel Express Passenger Engine—Highland Railway.

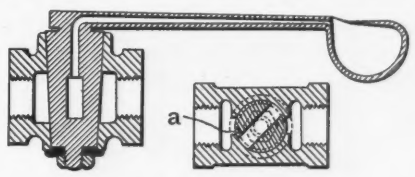
19½ in. x 26 in., driving wheels 69 in. diameter, and a four-wheeled engine truck with wheels 39 in. diameter. The boiler has ample heating surface for cylinders of this size. In the tubes there are 1,916 sq. ft., and in the fire-box 148 sq. ft., a total of 2,064 sq. ft. The grate area is 26 sq. ft. The rigid wheel-base of engine is 14 ft. 3 in., and the weight in working order 132,000 lbs.

The tender has two four-wheeled trucks, wheels 42 in. diameter, and has a tank capacity of 3,350 gallons of water, with fuel space for 260 cubic feet of coal. The total weight of tender in running order, with these amounts of coal and water, is 86,000 lbs., making a total of 218,000 lbs. for engine and tender in working order.

A pleasing fancy has been carried out in the lettering of these engines, by naming each one for a Scottish castle, Engine No. 140, the subject of the present illustration, being named Taymouth Castle.

Graham's Back-Up Air Signal.

Messrs. Sherburne & Co., of 53 Oliver street, Boston, have this year put on the market a new brakemen's air-brake and signal cock for controlling trains at the rear end when they are backing. The signal consists of an air whistle by which the brakeman at the tail end of the train, who, when the train is being backed, takes the place of the engineman as lookout, can instantly sound an alarm when necessary. The whistle is in the outer



Graham's Brake and Signal Cock.

end of the valve handle, and the air is led to it through a passage cored in the handle. The peculiarity of the signal is the small angular opening, shown at *a* in the drawing by which, on turning the handle part way, enough air is liberated to sound the whistle while still the pressure is not sufficiently reduced to affect the brakes. The designer of this signal is Mr. B. J. Graham, Chief Draughtsman of the Boston & Albany, at Springfield, and he has secured a patent on it.

Foreign Railroad Notes.

In England the private car owners, that is to say, the proprietors of coal mines and iron works, who furnish the freight cars required for the bulk freight to and from their works, have such a thorough understanding with each other that they have an association, now in its ninth year. The annual meeting of this association has just been held at Derby. Representatives of this association were prominent among the remonstrants before Parliament when the proposed automatic car coupler law was under discussion, and the proceedings at this meeting seem to indicate that the association has powerful influence with the Government. The great bulk of the cars owned by these traders are four-wheeled, and nearly all of the vehicles are equipped with buffers which have no springs.

TECHNICAL.

Manufacturing and Business.

W. J. Taylor, of the Taylor Iron & Steel Co., sailed for Europe Aug. 8 on the "Deutschland." Walter Gaston, General Manager of the company, sailed Aug. 1 on the "Majestic." Both are expected to return before Oct. 1.

Fitzhugh & Co., Monadnock Block, Chicago, dealers in railroad equipment, both new and second-hand, have opened an Eastern office at No. 141 Broadway, New York, to facilitate handling such equipment as may be placed with them for sale.

Richard D. Gallagher, Jr., has been appointed Mechanical Engineer of the Standard Coupler Co., New York. Mr. Gallagher has been for some time connected with the car department of the Grand Trunk at Montreal, and was formerly with Pullman's Palace Car Co., at Pullman, Ill.

In our issue of March 30, in noting the election of Clarence H. Howard to the Vice-Presidency of the Shickle, Harrison & Howard Iron Co., St. Louis, Mo., we spoke of the new plant of the company in East St. Louis, Ill., for making steel castings. The works have been in operation for about one and one-half months, turning out large quantities of high grade castings of various kinds, including freight car trucks and body bolsters, of which the company makes a specialty. Through Sanders & Co., London, agencies have been established in most of the foreign countries, and the company is now well equipped to handle its greatly increased business.

At a recent meeting of the stockholders of the Consolidated Railway Electric Lighting & Equipment Co. at the general offices of the company, 100 Broadway, New York, the following Board of Directors was elected: Walther Lüttgen, Norman Henderson, C. G. Kidder, George W. Knowlton, Thomas J. Ryan, Isaac L. Rice, Jno. N. Abbott and Aug. Treadwell, Jr. The Vice-President and General Manager of the company, Jno. N. Abbott, was formerly General Passenger Agent of the Erie R. R., and subsequently for several years Chairman of the Western Passenger Association in Chicago. This company is a consolidation of several concerns engaged in making electric lighting apparatus for steam railroad cars, the electricity being generated from the car axle while the car is in motion and furnished from a storage battery while the car is stationary. Power is thus furnished for fans also.

Iron and Steel.

Sol. Haas, President of the Sloss-Sheffield Steel & Iron Co., on account of ill health, has resigned, and is succeeded by E. O. Hopkins, heretofore Receiver of the Peoria, Decatur & Evansville R. R.

At a meeting of the directors of the Shelby Steel Tube Co., at Cleveland, Aug. 1, the resignation of President W. E. Miller was accepted, and he was elected chairman of the Board of Directors. Chas. T. Boynton, formerly General Sales Agent of the American Steel & Wire Co., was elected President of the Shelby Co. W. S. Miller was elected Treasurer, H. H. Cockley, Secretary, and William Thornburgh, General Manager.

There is no truth in the newspaper report that F. Krupp is about to build extensive works in Germany, to make railroad wheels and axles. For years Krupp has had a large wheel shop for making wheels of all kinds, and this shop already has in it a large amount of American tools. Krupp, however, is building new blast furnaces and a new rolling mill, etc., and for these new works he ordered from America several months ago a large amount of machinery.

Interlocking.

The Taylor Signal Co., of Buffalo, has taken a contract to put in two of its electric interlocking plants at crossings in West Chicago, Ill. The roads are the Elgin, Joliet & Eastern, the Chicago & Northwestern and the Chicago, Burlington & Quincy.

Electrical Equipment for the Boston Elevated.

The Westinghouse and Baldwin companies have taken the contract for motors and trucks for the Boston Elevated. This covers 200 motors of 150 h. p. each, with the necessary controllers and other apparatus. It also covers 100 motor trucks and 100 trailer trucks. The motor trucks will have Mr. Gibbs' patent suspension. The delivery is to begin in 60 days and all of the apparatus is to be delivered before Jan. 1.

New Shops at Hannibal.

The shops of the Hannibal & St. Joseph R. R. at Hannibal, Mo., are now being torn down to make room for new buildings of modern design. The present railroad shops, however, are of historic interest and are claimed to be the oldest in the State of Missouri. They were erected in 1856, and it is said that the first mail car in the West was built there, being run to connect the steamboats at Hannibal with the pony express at St. Joseph. I. N. Wilher, at present Master Mechanic in charge of the shops, has been in the employ of the road continuously for 43 years.

M. C. B. Standards.

The Secretary of the M. C. B. Association has sent out a letter ballot voting sheet on the proposed revisions. Ballots will be counted on Aug. 25, 1900, and all ballots received after that date will be excluded from the count.

A.—Revision of Standards and Recommended Practice.

1. Changing opening at back end of 5 x 9 journal box to 6¾ in. instead of 6⅞ in.
2. Location of brake-pipe nipple back of angle cock.
3. Extension of uncoupling lever for M. C. B. couplers to both sides of car.
4. Size of bolt heads, changed from Recommended Practice to Standard.

B.—Circumference Measure.

5. Adoption of wheel circumference measure.

C.—Journal Box, Bearing and Wedge.

6. Journal box, bearing and wedge for cars of 100,000 pounds capacity.
7. Journal bearing and wedge gages for journals 5 x 9 in. and 5½ x 10 in.

D.—Rules for Loading Long Materials.

8. Modification of rules for loading long materials.

E.—M. C. B. Couplers.

9. Modification of drop-test machine.
10. Marking M. C. B. Couplers bought on time specifications.

Nicaragua Canal.

It is announced that the Government of Nicaragua has annulled the Eyre-Cragin concession (the Interoceanic Canal Co., concessionaries). It will be remembered that the concession to the Maritime Canal Company was declared annulled some time ago and that within a few weeks the Government of Nicaragua had taken possession of certain property of that company.

Block Signaling on the Pennsylvania.

The Pennsylvania Railroad will extend its automatic electro pneumatic block signaling by an installation on the main line west of Philadelphia. The first section to be so equipped will be between Philadelphia and Paoli, 19.9 miles. As to the future we can say nothing now, although no doubt this system will be gradually extended.

THE SCRAP HEAP.

Notes.

On the night of Aug. 9 an express messenger on the Pittsburgh, Cincinnati, Chicago & St. Louis was murdered in his car between Cincinnati and Columbus. The murderer, who also robbed the safe, escaped before the trainmen discovered his crime.

The two men who robbed a Union Pacific passenger train near Limon, Colo., Aug. 5, and murdered a passenger, were surrounded and killed by a sheriff's posse at Goodland, Kan., on Aug. 10. One of the robbers refused to come out of the house and was burned to death.

The Supreme Court of Minnesota has decided that the Railroad Commissioners of that state have power to demand information from the United States Express Company only as to its property and business within the state. As regards property outside the state, or business which is interstate, the Express Company is exempt from supervision, because it is not a corporation. The court holds that a company called on for information can not be permitted to determine for itself whether or not it is possible to give a satisfactory answer; it must answer as far as it can, and state the facts which are claimed to afford an excuse for not answering more fully.

Traffic Notes.

Three ticket scalpers were arrested at Atlantic City, N. J., on August 9, on complaint of the Pennsylvania Railroad.

An investigation recently made at Galveston, where there has been a serious blockade of loaded grain cars, revealed the fact that the cars have contained only about 75 per cent. of their marked capacity. We judge that this refers to the average of all the cars of which the record was examined.

The state officials of West Virginia have received a complaint against the Norfolk & Western for enforcing "Jim Crow car regulations" in that state. It appears that the line of this road runs from Virginia into West Virginia and then, after a short distance, runs back into Virginia, and as the law of the latter state requires separate cars for negroes the railroad company carries out the same regulations throughout the whole route. Two female colored school teachers complain that they had to leave a train because they refused to ride in the car set apart for negroes.

At Newburyport, Mass., a person named Kilquin has been arrested for selling counterfeit thousand-mile tickets over the Boston & Maine. It appears that for several weeks it has been known that old mileage books, containing coupons for only a few miles, sold by ticket brokers, have been bought up by a gang of counterfeiters and refilled with new coupons. Close examination of the paper and printing was required to detect the counterfeits. The discovery was first made when a passenger brought back one of the bogus tickets to show the ticket agent a blank page which had been overlooked by the printer.

A New Ocean Record.

The "Deutschland" has again beaten her own and all other records. In her last outward voyage from New York she made Plymouth in 5 days 11 hours and 45 minutes. Her average speed was 23.32 knots an hour, which makes a new record, the average of the Kaiser Wilhelm having been 22.79. Her best day's run was 552 knots.

LOCOMOTIVE BUILDING.

The Rio Grande Western is in the market for locomotives.

The Norfolk & Western has ordered 10 engines from the Baldwin Locomotive Works.

The Atlantic Coast Line recently ordered two engines from the Baldwin Locomotive Works.

The Mexican International is having three engines built by the Schenectady Locomotive Works.

The Intercolonial of Canada order with the Richmond Locomotive & Machine Works for 10 consolidation engines, referred to Aug. 3, calls for locomotives with 56 in. driving wheels, to weigh in working order 164,000 lbs., with 147,000 lbs. on the driving wheels. The boilers are to be of the straight top type, 66 in. in diam. at the smoke box, and will carry 200 lbs. steam pressure. Five of the engines will be compounds, with 22½ in. and 35 in. x 30 in. cylinders.

The Cleveland, Cincinnati, Chicago & St. Louis order with the Baldwin Locomotive Works for four simple and two compound Vauclain passenger locomotives, referred to last week, calls for October delivery. These will be very heavy engines of the 10-wheel type and will differ only in the cylinder arrangement, the simple engines having 20 in. x 28 in. cylinders. The weight on drivers will be 148,000 lbs. and the total weight 186,000 lbs. The engines will have 78 in. drivers; extended wagon top boilers, with 200 lbs. steam pressure and 347 iron tubes, 2 in. in diam. and 14 ft. 9¾ in. long; and fire-boxes 10 ft. long and 41⅜ in. wide. The tenders will have a capacity for 6,000 gals. of water and 10 tons of coal. The special equipment includes: Westinghouse brakes, steel axles, pneumatic bell ringers, National Hollow brake-beams, Nathan injectors and lubricators, Jerome metallic packing, Coale and Kunkle safety valves, Leach sanders, Crosby steam gages, Gold steam heat equipment, Standard tires and Allen-Richardson valves.

CAR BUILDING.

The Missouri Pacific is in the market for 500 flat cars.

F. M. Pease has ordered 20 tank cars from the Illinois Car & Equipment Co.

Swift & Co. have decided not to order the cars that they were figuring on.

The Arkansas Midland has ordered 10 box cars from the American Car & Foundry Co.

The Kansas City, Fort Scott & Memphis has ordered 100 gondola cars from the American Car & Foundry Co.

The American Car & Foundry Co. has an order for 80 mine and 30 logging cars. The name of the buyer is not given.

The California Northwestern is having 20 freight cars built at the Huntington works of the American Car & Foundry Co.

The Louisville & Nashville has ordered 250 coal cars from the American Car & Foundry Co. They will be built at Jeffersonville.

Press dispatches state that the Chilian Congress has voted sufficient money to buy about 4,000 freight cars for the *Chilian State Railways.*

The Westmorcland Coal Co. has ordered 100 coal cars of 80,000 lbs. capacity, Pennsylvania R. R. specifications, from the American Car & Foundry Co. They will be built at Milton.

The Sterling Coal Co. has ordered 250 coal cars of 80,000 lbs. capacity from the American Car & Foundry Co. They will be built at the Milton Works, from Pennsylvania R. R. specifications.

BRIDGE BUILDING.

Baltimore, Md.—The Philadelphia, Wilmington & Baltimore has submitted plans to the County Board for a bridge at Winans Crossing, to cost $12,000.

Bayonne, N. J.—The Central R. R. of New Jersey will build two steel plate girder bridges about 50 ft. each, over East 21st and East 22nd streets, Bayonne.

Biddeford, Me.—Percy Richardson, of Portland, Me., is Consulting Engineer on the new Main street bridge. Address Mayor N. B. Walker.

Buffalo, N. Y.—New bids are reported wanted for the superstructure of the Seneca street bridge.

Cedar Falls, Iowa.—A drawbridge is reported proposed over Cedar River.

Chicago, Ill.—Bids are wanted, Aug. 20, at Room 1409, 100 Washington street, by the Aurora, Wheaton & Chicago Ry. for building the railroad, which includes trestle work.

Chili.—Bids are wanted, according to report, for building a large iron bridge over the River Maipu for the Chilian Government.

Clarion, Pa.—W. H. Gulick, of Phoenixville, Pa., will make the plans for the proposed $30,000 or $40,000 bridge over the Clarion River for the state.

Clarkton, Va.—Bids are wanted, Aug. 24, for an iron or steel bridge, 402 ft. long, of two spans 150 ft. each, the remainder being approach. F. G. Baldwin, of Clarkton, may be addressed.

CLEVELAND, OHIO.—The Big Four will build a lift bridge over the Cuyahoga River from the foot of South Water street, replacing the present center pier bridge.

DUNMORE, PA.—See Erie & Wyoming Valley R. R. under Railroad Construction.

FORT STEELE, WYO.—The Union Pacific will build a cut-off near this place that will require one bridge over the Platte River.

HINTONBURG, ONT.—Plans have been prepared for the bridge over the car tracks on the Richmond road.

MILWAUKEE, WIS.—Two bids were received for the new Grand street lift bridge: Wisconsin Bridge & Iron Works, $84,875; and the Milwaukee Bridge & Iron Works, $82,973.

NATCHITOCHES, LA.—The Natchitoches Railway & Construction Co. is reported to have rejected the bids for a bridge at Grand Ecore as being too high. They were as follows: King Bridge Co., $109,675; Clinton Bridge Iron Works, $110,000; Gillett-Hertzog Co., $115,500; Midland Bridge Co., $110,200; Pittsburgh Bridge Co., $118,000; M. S. Hazie (American Bridge Co.), $110,750; Missouri Valley Bridge & Iron Works, $108,300. D. C. Scarborough, President.

NEW BEDFORD, MASS.—Bids are wanted, Aug. 18, for removing the old bridge and building a temporary bridge between New Bedford and Fish Island. Charles S. Ashley, Mayor; Wm. F. Williams, City Engineer. (Aug. 10, p. 544.)

NEW YORK, N. Y.—The New East River Bridge Commission received seven bids, as follows, for the approaches: John T. Hall & Co., New York, for the Manhattan approach, $1,374,000; Brooklyn approach, $926,000; total, $2,300,000. King Bridge Co., Manhattan, $1,440,000; Brooklyn, $960,000; total, $2,400,000. American Bridge Co., Manhattan, $1,650,000; Brooklyn, $1,150,000; total, $2,800,000. New Jersey Steel & Iron Co., Manhattan, $1,400,000; Brooklyn, $1,000,000; total, $2,400,000. Michael J. Dady, of Brooklyn, Manhattan, $1,678,000; Brooklyn, $1,119,000; total, $2,797,000. Hydraulic Construction Co., No. 1 Broadway, Manhattan, $1,399,000; Brooklyn, $934,000; total, $2,333,000. Pennsylvania Steel Co., Manhattan, $1,464,000; Brooklyn, $947,000; total, $2,411,000.

The new steel bridge to be built over Dutch Kills Creek, at Borden avenue, Borough of Queens, will be a steel draw, 270 ft. long and 40 ft. wide, costing about $220,000.

PHILADELPHIA, PA.—Contracts will soon be let for the steel bridge on the line of Coulter street over the railroad tracks. The estimated cost is $22,000.

PITTSBURGH, PA.—The Schultz Bridge & Iron Co. (American Bridge Co.) has the contract for the Pittsburgh & Lake Erie steel bridge over the Back Channel of the Ohio River to Neville Island. It will be of four spans, the total length being 750 feet. Stratton, Lewis & Co. are building the foundations.

PULASKI, TENN.—The Giles County Court will meet on Aug. 23 to appoint a committee to build a bridge over Bradshaw Creek. James J. McCallum, County Judge.

REGINA, N. W. T.—J. S. Dennis, Commissioner of Public Works at Regina, wants tenders for a bridge.

RIVERHEAD (L. I.), N. Y.—The Suffolk County Supervisors have let the contract to the American Bridge Co. for the drawbridge between Sag Harbor and North Haven, at $13,200.

SOUTH BEND, WASH.—Bids will be received by the Board of County Commissioners, Aug. 23, for a bridge across the South Fork of the Nasel River at Nasel, and also for a bridge across the Wallicut River, to take the place of the present bridge.

SOUTH ORANGE, N. J.—The track elevation ordinance to permit the D. L. & W. to build five steel bridges over the tracks between South Orange and Milburn has passed the Township Committee.

TROY, OHIO.—Bids are wanted until Aug. 21 for a steel bridge over the canal on Market street. N. K. Staley, City Engineer.

UTICA, N. Y.—Bids are wanted by the State Superintendent of Public Works, Albany, N. Y., Aug. 21, for a steel lift bridge over the Erie Canal at Washington street, Utica.

WHITESBORO, N. Y.—Bids are wanted by the State Superintendent of Public Works, Aug. 21, for a steel foot bridge over the Erie Canal at Brainard street.

WILLIAMSTOWN, W. VA.—The Ohio River Bridge & Ferry Co. has been incorporated to build a bridge across the Ohio River between Williamstown and Marietta, Ohio. Incorporators: J. Ed. Mendel, William L. List, of Wheeling, W. Va.; Martin F. Noll, of Marietta, Ohio.

Other Structures.

ARLINGTON, N. J.—The Arlington Copper Co. wants bids for building, at once, steel buildings as follows: Crushing plant, 48 x 66 ft.; building adjoining, 216 x 30; roasting furnace, 200 x 28; depositing plant, 60 x 38; power house, 48 x 72, to be built of stone and steel. The capacity will be 125 tons a day. A steel stack 80 ft. high will be built. The engineering department includes, Dr. W. S. Keith, Chief Metallurgist; J. W. Granby, Civil Engineer, formerly assistant engineer of the Manhattan Street Railway Co., New York; and William Kemp, Mechancal Engineer.

BEAVER FALLS, PA.—The works of the Shelby Steel Tube Co. and the Boston Electroduct Co. were burned Aug. 9, causing a loss of $300,000.

BUFFALO, N. Y.—The Dakota Elevator, used by the Lehigh Valley R. R., and containing about 500,000 bushels of grain, was burned Aug. 13, causing a loss approximating $500,000.

DURHAM, N. C.—The roads entering this city have not agreed upon plans for a union station at Durham, as recently reported.

SPRINGFIELD, OHIO.—The Pennsylvania Co. is considering building a union depot with the Ohio Southern, in Springfield.

WESTWEGO, LA.—The Texas & Pacific contemplates building an additional elevator at Westwego, but nothing definite is decided.

WYOMING, MASS.—The Boston & Maine has let a contract to Mead, Mason & Co. for a $15,000 buff brick passenger station, 55 x 30 ft., in Wyoming.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xi.)

Eastern Maintenance of Way Association.

The eighteenth annual convention of the Eastern Maintenance of Way Association will be held at the Grand Union Hotel, Saratoga Springs, N. Y., Sept. 19, 20 and 21. There will be ample space provided by the association for exhibition purposes. This space will be in charge of the Supply Association for allotment, but all notifications for space, stating approximately the least amount of space wanted, should be sent to F. C. Stowell, Secretary, care of B. & M. R. R., Ware, Mass., on or before Sept 15. All such notices will be recorded in the order received. It is suggested that exhibits be in position early in the morning of the 19th.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. C. C. Bowen, of Detroit, died Aug. 9, at his home, aged 69 years. Mr. Bowen was Secretary and Treasurer of the Santa Fe, Prescott & Phoenix.

—Mr. T. M. Gibb, who recently resigned as Division Master Mechanic of the Colorado & Southern, has been appointed Master Mechanic for the Colorado Fuel & Iron Co., at Redstone, Colo.

—Mr. Collis P. Huntington, President of the Southern Pacific and allied railroads, died suddenly in the early morning of Aug. 14 at Pine Knot Lodge, in the Adirondacks. A sketch of his life, with portrait, appears in another column.

—Judge John H. Reagan, Chairman of the Railroad Commission of Texas, has presented his resignation to Gov. Sayers, to take effect after the next general election, on Nov. 6. Mr. Reagan is 82 years old and has been in public service for more than 60 years.

—Mr. William N. McMahan, at one time Superintendent of the Mississippi Division of the Baltimore & Ohio Southwestern, died recently. He was born in Martin County, Ind., and began his railroad career in 1868 with the Ohio & Mississippi, which road he served for several years as telegraph operator, chief dispatcher and trainmaster.

—Mr. Robert S. Hughes, President of the Rogers Locomotive Company, died last Saturday at his home in Paterson, N. J. Mr. Hughes was born in Paterson, May 24, 1827, and his whole working life had been spent with the Rogers Locomotive Company and the firms which it succeeded. He was interested in the Rogers Locomotive & Machine Works from its organization, and for a long time was Secretary and later Treasurer. When Mr. Jacob S. Rogers retired from the presidency and the name was changed to the Rogers Locomotive Company Mr. Hughes was elected President.

—Mr. H. L. Marvin, who became Chief Engineer of the St. Louis, Kansas City & Colorado, with headquarters at Union, Mo., on July 1, was born in Clinton County, N. Y., Aug. 6, 1835. He was graduated from Union College in 1861, and served nearly four years in the Union army. He lived at Kansas City, Mo., for 22 years and at Lawrence, Kan., 13 years more. His work has consisted of reconnaissance, location, construction and maintenance of railroads and bridges and of municipal engineering, and his field has extended from the Mississippi River to the Rocky Mountains and from Iowa and Nebraska to the Gulf.

—Mr. Charles Hansel, C. E., has accepted the position of General Manager of the General Power Company, at 100 William street, New York city. This company makes the Secor internal combustion engine, using either gas or kerosene oil, a description of which recently appeared in the *Railroad Gazette*. Mr. Hansel is well known to a large number of our readers. He was at one time Chief Engineer of the Wabash, was Signal Engineer to the Illinois Railroad & Warehouse Commission, was Vice-President and General Manager of the National Switch & Signal Company, and after the absorption of that company by the Union Switch & Signal Company Mr. Hansel became Manager of the Department of Sales and Installation of the new organization, which position he shortly resigned to take up other work. Probably the best known work done by Mr. Hansel was in the organization and development of the National Company, which he carried out with skill and success.

—Col. Frederick E. Prime, Corps of Engineers, U. S. A. (retired) died at his home, at Litchfield, Conn., last Sunday. He was born Sept. 24, 1829, and was appointed to the West Point Military Academy from New York, being graduated in 1850 at the head of his class. His first service was on the fortifications about New York Harbor, including the building of Fort Schuyler. At the outbreak of the civil war he was captured at Pensacola, while on his way to Fort Pickens, but was soon exchanged and was wounded and taken prisoner during a reconnoissance near Mill Spring, Ky., on Dec. 5, but was back to the army again in time to join Gen. Grant in the Spring of 1862. He served through the war with usefulness and distinction. He was brevetted Major for gallantry at the battle of Corinth, and Lieutenant Colonel for gallantry during the siege of Vicksburg, and was promoted to the rank of Major in the Corps of Engineers June 1, 1863. He was brevetted Colonel March 13, 1865, for gallant and meritorious services during the war. After the war he was a member of the special board in charge of the work at Willet's Point. His later services were in connection with the improvements of the mouth of the Mississippi and the survey of Galveston Harbor. He was retired Sept. 5, 1871.

—Mr. James Hemphill died in Pittsburgh, Pa., Aug. 7, and so has passed away another one of the great iron masters of the Pittsburgh district. He was born at Mechanicsburg, Pa., July 22, 1827, was apprenticed to Samuel Black, at McKeesport, where he went to learn the blacksmith trade, and in 1850 took employment under Mr. Joseph French, Engineer of the Pittsburgh Water Works. When Mr. French became Superintendent of those works Mr. Hemphill succeeded him as engineer. While he was there he took up as a side business the manufacture of baggage checks and he always looked back with gratitude to the fact that Mr. Scott, then Superintendent of the Pittsburgh Division of the Pennsylvania, gave him a valuable start by helping him to make some money this way. The story goes, in fact, that Mr. Hemphill made the first baggage checks that were used in the United States. In 1856 or 1857 he started a small machine shop, and in 1859 a larger one in partnership with W. S. McIntosh and H. F. Hart. This grew into the Fort Pitt Foundry of McIntosh, Hemphill & Co. Mr. Hemphill, as an engineer, had a characteristic in common with Mr. John Fritz, and it may be that it was the outgrowth of the hard practical experience of those gentlemen in their early life. Both of them believed in designing for weight, strength and large bearing surface. He held that for rolling mill service at any rate it was more important that an engine should not break down than it should be designed to the lowest factor of safety. Mr. Hemphill introduced the reversing blooming mill at the Pittsburgh Bessemer Steel Works, the plant which later developed into the Homestead Works of the Carnegie Company. This was not the first reversing mill that had been tried, but perhaps it was the first successful one. As time went on and Mr. Hemphill's judgment and experience broadened he was called on to take other responsibilities, and in 1893 was elected President of the National Bank of Western Pennsylvania. Besides being an excellent business man Mr. Hemphill was a sound engineer, a fertile inventor, a man of high integrity and of physical and intellectual force. In brief he was one of the fine old breed of iron men, a few of whom are still alive.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—We are informed that H. U. Mudge, General Manager of this company, has not accepted the Vice-Presidency of the Kansas City, Fort Scott & Memphis, although various newspaper reports stated that such was the case.

Atlantic City (Reading).—Charles A. Beach will, it is understood, on Sept. 1, succeed T. D. Whitcomb as Superintendent.

Beattyville & Cumberland Gap.—J. H. Pearson has been appointed Chief Engineer, with headquarters at Irvine, Ky.

Bangor & Portland (Delaware, Lackawanna & Western).—This company, recently acquired by the D., L. & W., was reorganized Aug. 14, and the following were elected Directors: W. H. Truesdale, B. D. Caldwell and F. H. Chambers, New York; Edward Warren and B. E. Loomis, Scranton; Conrad Miller, Nazareth, and G. W. Mackey, Bangor. Mr. Truesdale was elected President, Mr. Caldwell Vice-President, Mr. Chambers Secretary and Treasurer, and Mr. Mackey Solicitor. (R. R. News column, Aug. 10, p. 546.)

Cincinnati, New Orleans & Texas Pacific.—A. Telford will, in addition to his duties as Secretary, act as Purchasing Agent, relieving G. B. Nicholson, Chief Engineer to this extent, effective Aug. 1.

Intercolonial.—Samuel King has been appointed Master Car Builder, with headquarters at Moncton, N. B.

Iowa Central.—Edward Kelly has been appointed General Roadmaster.

Louisiana & Arkansas.—B. S. Atkinson has been appointed Assistant General Freight and Passenger Agent, with headquarters at Minden, La., effective Aug. 4.

Missouri, Kansas & Texas.—W. L. Seelig has been appointed Assistant General Auditor, effective at once. The position of Auditor of Receipts and Disbursements, formerly held by Mr. Seelig, has been abolished.

Northern Pacific.—W. G. Pearce, Assistant General Superintendent, has been appointed Assistant to President C. S. Mellen.

Ohio Southern.—H. G. Myers has been appointed Auditor succeeding C. D. Whitney. H. A. Fidler has been appointed Assistant General Freight Agent, and C. W. Mordoff, Assistant General Passenger Agent, with headquarters at Springfield, O.

Pacific & Idaho Northern.—George Pope has been elected Secretary, with headquarters at Hartford, Conn.

Philadelphia & Reading.—William Hunter, who has been Acting Chief Engineer, has been appointed Chief Engineer, succeeding Henry K. Nichols, who becomes Consulting Engineer, effective Aug. 9. Mr. Nichols was recently granted a few months leave of absence, at which time a brief sketch of his life appeared. (June 22, p. 433.) The jurisdiction of W. G. Besler, Superintendent of the Reading Division, has been extended over the Lebanon Division, owing to the resignation of A. M. Wilson.

Pere Marquette.—The headquarters of H. C. Potter, Jr., Comptroller and Assistant Secretary; John Doyle, Superintendent of Track; G. H. Kimball, Chief Engineer, and F. V. Davis, General Freight Agent, have been removed from Grand Rapids, Mich., to Detroit, Mich., and those of A. Patriarche, Traffic Manager, and P. F. Gaines, Assistant General Freight Agent, from Saginaw, Mich., to Detroit, Mich.

Quincy, Carrollton & St. Louis.—Jas. K. Connors has been appointed Auditor, succeeding E. W. Clifford, resigned.

St. Joseph & Grand Island.—G. P. Smith, Chief Engineer at St. Joseph, Mo., has resigned. Mr. Smith's successor has not as yet been chosen.

St. Louis, Caruthersville & Memphis.—J. M. Miller has been appointed Auditor.

Union.—W. H. Smith, Chief Engineer at Pittsburgh, Pa., has resigned.

Wheeling & Lake Erie.—W. S. Newhall has been appointed Chief Engineer, succeeding Chas. Blackwell.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ARKANSAS NORTHERN.—The Arkansas State Board of Railroad Incorporation has declared forfeited the charter of this company which was incorporated several months ago to build from Little Rock, Ark., northwest 211 miles, to the Missouri state line, and ultimately to Springfield, Mo. (Construction Supplement, July 27, 1900.)

ATLANTIC COAST LINE.—The company has decided to do its own work on the cut-off and other improvements at Emporia, Va. The bids of contractors were considered too high. (Aug. 10, p. 545.)

BALTIMORE & OHIO.—A branch is proposed from a point on the main line about two miles west of Piedmont, Va., to run up the Savage River to coal lands in

Garret and Allegheny counties, Md., owned by Reakirt Bros. & Co., of Philadelphia.

An officer writes that plans have not been completed for the proposed yards at Morgantown, W. Va., and Smithfield, Pa. (Aug. 3, p. 531.

Boston & Maine.—An officer writes that there are no definite plans regarding improvements at Marblehead, Mass. (Aug. 3, p. 531.)

Butte, Anaconda & Pacific.—Condemnation proceedings have been entered for right of way for a spur at Anaconda, Mont., to new smelters east of the city, 1.93 miles.

Central Vermont.—An officer confirms the statement that the Montreal & Providence line is to be extended from Farnham, Que., southeast about 18 miles to Frelighsburg. No arrangements have been made as yet for building. (Aug. 3, p. 531.)

Chicago & Alton.—The company is doing much work in reducing the grades, ballasting and renewing bridges.

Chicago & Northwestern.—Plans are reported being made for a line from Pipestone, Minn., northeast about 75 miles via Tracy, Seaforth and Redwood Falls to Beaver Falls.

Chilkat Pass Railway & Navigation.—Application has been made to the British Columbia Legislature to incorporate this company to build from a point on the northern boundary of the Province at or near the intersection of the Dalton Trail, thence south to the Indian village of Kluckwan, District of Cassiar, or to a point on the International boundary nearest the shores of Lynn Canal. Among the petitioners are John Irving, Charles W. Rhodes and Frank C. Davidge.

Cuban Central.—Preliminary work is reported begun on an extension of this line in Cuba and the contractors are advertising for men.

Denver & Rio Grande.—Orman & Crook, of Pueblo, Colo., are reported to have taken the contract for the 26 miles of extension from Texas Creek to Silver Cliff, Colo. The work is to be completed by Dec. 1. (Construction Supplement. July 27, 1900.)

Des Moines & Northern.—Contracts are reported let for about 12 miles from Webster City, Iowa, south across the Boone River for this line from Wayne County on the Missouri line north through Des Moines to the northern boundary line. Arthur Reynolds, President of the Des Moines National Bank, is an incorporator. (July 13, p. 488.)

Elk Creek.—This company has been incorporated in West Virginia with a capital stock of $20,000. The headquarters are at Clarksburg.

Erie & Wyoming Valley.—A contract has been let to the Elmira Bridge Company for the renewal with the heaviest of modern structures of all the bridges on the main line except four under which the company intends to build masonry and culverts and replace with permanent fills. The policy has also been adopted of making changes in the line to reduce the curvature. Several changes of this character have been made this year. The relaying of the line with 80-lb. rails has been continued to some extent, the old 67-lb. rails being used in the new yards. (Official.)

Grand Forks & Kettle River.—Application is to be made at the present session of the British Columbia Legislature for a charter for this company to build from Grand Forks, B. C., to Carson, on the International boundary, five miles. Among those interested are Hon. J. R. Stratton, Provincial Secretary of Ontario; T. P. Coffee, associated with Mr. Stratton in the Dominion Permanent Loan Co.; T. W. Holland, of the Grand Forks Town Site Co., and George H. Cowan, of Vancouver, B. C. The intention is to push building as soon as the preliminaries are arranged for.

Grand Rapids, Grand Haven & Muskegon.—This company has been organized in Michigan, to build an electric line connecting the three cities named in the title. It will be about 44 miles long and will cost from $1,250,000 to $1,500,000. Surveys are in progress. The officers are: President, James D. Hawks, President of the Detroit, Ypsilanti & Ann Arbor, and also President and General Manager of the Detroit & Mackinac; Vice-President, Thos. F. Carroll; Treasurer, Wallace Franklin; Secretary, Jos. Kerwin. The firm of Westinghouse, Church, Kerr & Co. has the contract for electrical machinery.

Grand Trunk.—A survey is in progress for a branch from Lynden, Ont., to Brantford, in connection with the plan for running the main line through the city of Brantford. Brantford is now on a branch line.

Gulf Coast.—James H. Collins, 718 Chamber of Commerce, Chicago, has a 60-day option on the contract to take the bonds and build this electric line from Biloxi, Miss., along the Gulf Coast at high water line, via Mississippi City, Gulf Port, Long Beach and White Harbor to Pass Christian, with a three-mile spur from Mississippi City to Handsboro, in all 32 miles. The line is surveyed and nine-tenths of the right of way obtained. Work will be very easy. No bridges are required. The rails will be 60-lb. Passenger and express coaches will be used on the main line. A. M. Dahlgren is President, James B. Cable Vice-President, J. V. Ross, Secretary and Treasurer, and W. L. Covel, General Manager. (Aug. 10, p. 546.) The central office is Biloxi. (Official.)

Kahola & Hilo.—Contracts will be let in September, according to reports from Honolulu, for a 13-mile section of this line on the island of Hawaii from Hilo, on the east side of the island, to run north and east along the coast to Mahukona and thence to Niulee. Herbert B. Gehr, of Honolulu, the President, has left for New York. Jaudon Browne, of 1006 Betz Building, Philadelphia, is General Manager. (Jan. 19, p. 48.)

Kamloops & Atlin.—Application has been made to the British Columbia Legislature to incorporate this company to build from a point near the outlet of Kamloops Lake to the plateau of the Bonaparte River, thence to a point on the Cariboo wagon road near Hundred-Mile House, thence south to a point near Williams or Atler Creek in the Cariboo District. H. P. Bell, E. H. Macdowall and T. Lubbe are the petitioners.

Kansas & Southern.—A new charter has been granted to this company in Kansas, with a capital stock of $50,000, to build from a point on the northern boundary of the state, in Nemaha county, to run south through the counties of Nemaha, Marshall, Pottawatomie, Wabaunsee and Lyon, to Emporia, 140 miles. The company built last year from Westmoreland to Blaine, 8½ miles. Geo. G. Moore, of Westmoreland, is Chief Engineer.

Lake Bennett.—Application was made in the British Columbia Legislature at the opening session to incorporate this company to build from a point on the Dyea River, near the Provincial boundary, to a point on Lake Bennett and thence to the 60th parallel. Frank Higgins, Victoria, B. C., is the Solicitor. (Construction Supplement, July 27, 1900.)

Lansing & Northern.—This company has been incorporated in Michigan with a capital stock of $60,000.

Louisville & Atlantic.—Building is reported in progress on the extension proposed some time ago from Irvine, Ky., to Beattyville, 35 miles, and some 18 miles is graded. It is proposed to extend the line about 90 miles in all to a connection with the Norfolk & Western.

Lynn Canal Short Line.—Surveys are reported completed and contracts are to be made within 60 days for this line from Skagway, Alaska, to Dyea, 4 miles. C. A. Schilrede is President, Anton Laummeister Secretary, and J. H. Diers Chief Engineer, all of Skagway, Alaska. (July 13, p. 488.)

Maine Central.—The company is raising its tracks between Foxcroft and Newport, Me.

Manitoba & Lake Superior.—This company has been incorporated in Minnesota with a capital stock of $100,000, to build a railroad from Duluth, northwest to Winnipeg. It is believed to be a subordinate company of the Canada Atlantic. Joseph J. Rose, Secretary of the Canada Atlantic Transit Co., at Duluth, Minn., is an incorporator.

Mansfield Short Line.—Money is reported obtained for completing this line from Shelby, Ohio, northwest to Mansfield. C. W. French, of Mansfield, is President. (Construction Supplement, July 27, 1900.)

Moscow, Camden & San Augustine.—Building is begun on about four miles of an extension of this line. The road was completed from Moscow, Tex., to Camden, seven miles, in 1898. W. T. Carter, of Camden, Tex., is President. (Construction Supplement, July 27, 1900.)

Nashville, Knoxville & Great Eastern.—This company has been organized at Harriman, Tenn., to build a railroad from Monterey, northeast about 75 miles, via Glen Mary to Jellico. H. F. Backston is President, W. M. Fields, General Manager and Ed. C. Matson, Superintendent.

National Tehuantepec.—The principal features of the contract entered into for rebuilding this line provide that the company shall complete the improvements within 3½ years from the signing of the contract, July 10. At least two trains are to be run weekly from each of the terminal stations and the journey between ports is not to exceed 14 hours. The government is to pay $5,000,000 (Mexican currency) in monthly installments of $300,000, beginning within three months from the signing of the contract. The capital of the company is placed at $5,000,000, of which one-half is supplied by the government. Losses and profits are to be equally divided between the government and the company. In case the losses exceed $4,000,000, the company can rescind the contract, notifying the government six months in advance. The contract is to extend 50 years after the completion of the work. (Construction Supplement, July 27, 1900.)

New Jersey & Philadelphia.—This company has been formed, it is stated, by Boston capitalists to complete a trolley line from Trenton to Philadelphia. It is said that the company has bought the Upper Delaware bridge at Trenton and will build or acquire a line via Morrisville and Eddington, and that a branch will run from Emilie, Pa., to Bristol. A portion of the proposed route is covered by the lines of the Bristol Passenger Ry. Co., and the Philadelphia & Bristol.

New York Central & Hudson River.—An officer writes that there is no truth in the published reports that the company contemplates, in the near future, the straightening of its tracks between Kingsbridge and Spuyten Duyvil, N. Y.

New York Roads.—The Board of Aldermen of North Tonawanda has granted permission to the Tonawanda Iron & Steel Co. to lay about one mile of track along the river road.

Northern Pacific.—Preliminary work has been begun by Larson & Greenough, the contractors, at Arlington, Wash., for the proposed branch from Arlington to run east, about 30 miles, to Darlington. Sub-contracts will be let at once. (July 13, p. 488.)

Oregon Midland.—Arrangements are reported completed for building the proposed line from Klamath Falls, Ore., southwest 84 miles, to Klamathon, Cal., near the state line. L. W. Van Horn, of Ashland, Ore., is Vice-President and General Manager. (Construction Supplement, July 27, 1900.)

Oregon Railroad & Navigation.—N. D. Miller, of St. Paul, Minn., has taken a contract for a cut-off and other improvements from mile post 66, east of Hood River, in Oregon, to mile post 77.

Pacific & Omneca.—Application has been made to the British Columbia Legislature for a charter to build this line from a point on the Kitinaat Inlet in the Coast District to a point at or near Hazelton on the Skeena River District of Cassiar. John Irving, J. A. Mara and F. S. Barnard, of Victoria, B. C., are the petitioners.

Peoria & St. Louis.—The statement was incorrectly made in the Construction Supplement that work has been suspended on this line. An officer writes that work was discontinued on the road last fall and was resumed this spring and is now in progress. The intention is to put an increased force upon the work so as to insure the completion probably by November. D. L. Wing, 311 New York Life Building, Chicago, is the general contractor. (Official.)

Plant System.—The St. Johns & Lake Eustis has filed a mortgage for $500,000 for extensions and improvements. (See Railroad News column.)

Quebec & Lake Huron.—John D. Cameron, of Quebec, has taken the contract for a portion of this line from Quebec west about 440 miles via St. Alban and Mattawa to the mouth of the French River on the Georgian Bay. J. D. Hawks, President and General Manager of the Detroit & Mackinac Ry., Detroit, is among the directors. (May 18, p. 330.)

San Francisco & San Joaquin Valley.—The supervisors of San Francisco, Cal., have decided to grant a franchise for an extension on Illinois street in that city. (April 27, p. 280.)

San Jorges Bay & Eastern.—Tracklaying is reported in progress on this line in the State of Sonora, Mexico, from San Jorges Bay, on the Gulf of California, to run to the Los Pintos mines, in the Altar District, 13 miles. It is stated that the company will extend its line to Quitovac, 30 miles additional. J. H. Holmes is President and Wm. R. Staats is Secretary, both of Pasadena, Cal. (Construction Supplement, July 27, 1900.)

Santa Fe, Prescott & Phoenix.—Surveys are reported in progress for an extension of the Prescott & Eastern line from Mayer, Ariz., to the Crown King Mines in the Bradshaw Mountains, about 40 miles.

Seaboard Air Line.—Permission is being asked, according to report, to make connection from the tracks of this company with the Southern and the Atlantic Coast Line at Columbia, S. C.

Sioux Falls & Northwestern.—Surveys are in progress for this proposed line from Sioux Falls, S. Dak., to run southwest about 175 miles, via Madison and Brookings, to Aberdeen. (June 22, p. 434.)

Southern.—Oliver & Co., of Birmingham, Ala., are reported to have the contract for the extension from Maryville, Tenn., to run southeast about nine miles to Gamble's store. (Construction Supplement, July 27, 1900.)

Southern Pacific.—Building is reported about to begin on a branch from Marfa, Tex., on the main line, to run south about 50 miles to Terlingua, near the Mexican border.

According to report, building will be begun as soon as the rainy season has ended, on the Sonora branch from Ortiz station, Mex., to the coal mines at La Barranca, about 90 miles. (May 25, p. 348.)

Texas Roads.—The Sabine Tram Co., of Laurel, Tex., has nearly completed a lumber line from Laurel to Dewey, nine miles. Bluitt Smith, of Laurel, is President.

Union Pacific.—The company is reported about to begin work on a cut-off about five miles long at Fort Steele, Wyo., which will require a new bridge across the Platte River.

Wild Goose.—Building is in progress on this line at Nome, Alaska, from the shore of the Behring Sea toward Anvil Creek, 4½ miles, and track is reported laid for 3½ miles. The Wild Goose Mining & Trading Co., 532 Market street, San Francisco, Cal. J. P. Hopkins, Secretary, is interested. (Construction Supplement, July 27, 1900.)

GENERAL RAILROAD NEWS.

Boston & Maine.—Proposals have been received for $500,000 of Fitchburg 3½ per cent. 20 year refunding bonds and for $441,500 Maine Central 4 per cent. 12 year refunding bonds.

Cedar Rapids, Garner & Northwestern.—This line, 18 miles long, built about two years ago, has been bought by the Burlington, Cedar Rapids & Northern.

Hocking Valley.—Holders of Columbus & Toledo second mortgage 7 per cent. bonds, due Sept. 1, may exchange the same for new Hocking Valley first consolidated 4½ per cent. bonds at 99½ and accrued interest at the office of J. P. Morgan & Co., New York. Holders may elect to receive cash in full.

Kentucky & Indiana Bridge & Railroad.—This company was incorporated August 8 in Kentucky, as successor to the Kentucky & Indiana Bridge. The capital stock is $75,000. (June 29, p. 458.)

Louisville & Nashville.—Thirty first-mortgage bonds of the Henderson Bridge Co. have been drawn for redemption at the office of the Central Trust Co., of New York, on Sept. 1, at 105.

The gross earnings for the year ending June 30, 1900, were $27,742,379, against $23,759,486 last year, a gain of $3,982,893. The net earnings for this year were $9,138,973, against $8,027,898 last year, a gain of $1,111,075. The balance surplus this year, after taking out fixed charges, dividends of 4 per cent., etc., was $1,507,234.

Michoacan & Pacific.—The Mexican National has effected a lease of this property for 25 years for a percentage of the gross receipts. The line extends from Maravatio, Mex., on the Mexican National, to Zitacuaro, 57 miles. (Aug. 3, p. 532.)

Missouri, Kansas & Texas.—A temporary injunction has been granted against the consolidation of the Kansas City & Pacific with this company. It also restrains from exchanging the common stock of the K. C. & P. under the proposed plan. (May 11, p. 312.)

Norfolk & Western.—The gross earnings for the year ended June 30, 1900, were $14,090,005, against $11,827,139 last year, a gain of $2,262,866. The net earnings this year were $5,589,909, against $3,888 036, a gain of $1,701,873. This year's surplus for dividends amounts to $3,316,270, and the usual dividends of 4 per cent. on the preferred have been paid, amounting to $909,716. Extensive improvements are to be made the coming year.

Pittsburgh, Painesville & Fairport.—A committee has been formed to protect the interests of holders of first mortgage terminal bonds of this company. (Aug. 3, p. 532.)

St. Johns & Lake Eustis (Plant System).—The company has filed a mortgage to the Metropolitan Trust Co., of New York, as trustee, to secure $500,000 bonds to be used in extending and improving the line.

Santa Fe & Grand Canyon.—Application has been made for a receiver for this new line, which is projected from Williams, Ariz., on the Santa Fe Pacific, north 63¾ miles, via Flagstaff to the rim of the Grand Canyon of the Colorado. All but 10 miles was completed at last report. (Construction Supplement, July 27, 1900.)

Southern.—The average mileage operated during the year ended June 30, 1900, was 6,307.12 miles, against 5,377.5 miles last year. The gross earnings for this year were $31,207,870, against $25,353,686 last year, a gain of $5,854,184. The net earnings this year were $9,369,423, against $7,997,331 last year, a gain of $1,372,092. After deducting interest, rentals, etc., there was a balance of $2,917,252 this year, to be applied to dividends. Out of this, dividends of 3 per cent. were paid on the preferred stock, requiring $1,800,000.

Trenton, Lawrenceville & Princeton.—Press reports from Trenton, N. J., state that arrangements have been made with the Philadelphia & Reading for an interchange of freight and passengers with this company. The road, when completed, is to extend from Trenton, N. J., northeast about 15 miles, via Lawrenceville, to Princeton. (Construction Supplement, July 27, 1900.)

Visalia & Tulare.—This property was sold Aug. 7 to W. D. Hofius & Co., of Seattle, Wash. The line runs from Visalia, Cal., to Tulare, 11.5 miles.